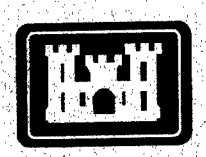
Contract No. DACW29-97-D-0017
Delivery Order No. 0003



U.S. Army Corps
of Engineers
New Orleans District

HISTORIC NAVIGATION AND SHIPWRECK STUDY, LOWER ATCHAFALAYA BASIN RE-EVALUATION STUDY, SOUTH CENTRAL LOUISIANA

March 2001

Final Report

Coastal Environments, Inc.
1260 Main Street
Baton Rouge, Louisiana 70802

Prepared for:

U.S. Army Corps of Engineers
New Orleans District
P.O. Box 60267
New Orleans, LA 70160-0267

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	March 2001	Final

4. TITLE AND SUBTITLE
Historic Navigation and Shipwreck Study, Lower Atchafalaya Basin, Re-evaluation Study, South Central Louisiana

5. FUNDING NUMBERS
DACW29-97-D-0017
Delivery Order No. 3

6. AUTHOR(S)
Thomas C.C. Birchett, Charles E. Pearson and George J. Castille

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Coastal Environments, Inc.
1260 Main St.
Baton Rouge, LA 70802

8. PERFORMING ORGANIZATION REPORT NUMBER
AR-446

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Corps of Engineers,
New Orleans District

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
DACW29-97-D-0017
Delivery Order No. 3

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Unclassified/Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The history of navigation and watercraft use within the Atchafalaya Basin of Louisiana and adjacent coastal areas and the Gulf of Mexico is presented. The types of vessels used, their cargoes and the routes they traveled from 1718 to the present are discussed. An inventory of reported shipwrecks in the study area, consisting of 295 entries, has been compiled and the characteristics of these losses are discussed. The geological history of the region is summarized and the post-sinking impacts to shipwrecks resulting from natural and cultural processes are analyzed. A synthesis of the collected information is presented in the form of probability statements for the occurrence of historic boat wrecks along the waterways of the study area. General recommendations for the treatment and management of shipwrecks are presented.

14. SUBJECT TERMS
shipwrecks
steamboats
navigation history
Atchafalaya Basin
Louisiana

15. NUMBER OF PAGES
210

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

HISTORIC NAVIGATION AND SHIPWRECK STUDY, LOWER ATCHAFALAYA BASIN RE-EVALUATION STUDY, SOUTH CENTRAL LOUISIANA

March 2001

Final Report

by

Thomas C.C. Birchett
Charles E. Pearson
and
George J. Castille

Prepared for:

U. S. Army Corps of Engineers
New Orleans District
(Contract No. DACW29-97-D-0017,
Delivery Order No. 0003)

Coastal Environments, Inc.
1260 Main Street
Baton Rouge, Louisiana 70802

Charles E. Pearson
Principal Investigator

ABSTRACT

The history of navigation and watercraft use within the Atchafalaya Basin of Louisiana and adjacent coastal areas and the Gulf of Mexico is presented. The types of vessels used, their cargoes and the routes they traveled from 1718 to the present are discussed. An inventory of reported shipwrecks in the study area, consisting of 295 entries, has been compiled and the characteristics of these losses are discussed. The geological history of the region is summarized and the post-sinking impacts to shipwrecks resulting from natural and cultural processes are analyzed. A synthesis of the collected information is presented in the form of probability statements for the occurrence of historic boat wrecks along the waterways of the study area. General recommendations for the treatment and management of shipwrecks are presented.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

The authors would like to acknowledge and thank several individuals who graciously contributed time or information to this study. First, we would like to thank Mr. Michael Stout and Dr. Kenneth Ashworth who served as the Authorized Representatives for the Contracting Officer for the New Orleans District, Corps of Engineers for this project. Also thanked are the personnel at the various archives and libraries visited, particularly the Houma Public Library, the Morgan City Archives and Hill Memorial Library at Louisiana State University, Baton Rouge. Mr. Bill Reeves of New Orleans examined archival sources in that city and Dr. Don Davis provided information on recent boat use in the Atchafalaya region. Curtis Latiolais of Coastal Environments, Inc., prepared some of the maps for this study and Cherie Schwab was responsible for the production and design of this report.

CHAPTER 1

INTRODUCTION

Background of the Project

This report presents the results of a study of the navigation history and shipwreck occurrence and potential within the Lower Atchafalaya Basin and adjacent coastal areas of southern Louisiana. This study was implemented because this entire region is affected by a variety of U.S. Army Corps of Engineers (COE) projects associated with the operation and maintenance of the Atchafalaya Basin Floodway. This investigation was conducted by Coastal Environments, Inc., pursuant to Delivery Order No. 0003 of Contract No. DACW29-97-D-0017. The time period of interest for this study extends from the earliest Euro-American settlement in the region to the present. The principal purpose of this study is to provide the New Orleans District of the U.S. Army Corps of Engineers with a body of data that can be used to enhance and improve their present program for managing underwater cultural resources within the study area.

A particular class of cultural resources, namely boat wrecks, are of interest in this study. (As used throughout this report, the terms "shipwreck" and "boat wreck" are equivalent.) This resource is of particular concern to the New Orleans District for a number of reasons. The study area, consisting of the Atchafalaya Basin, the adjacent coastal zone and the nearshore segment of the Gulf of Mexico, is a region dominated by the presence of water. The Atchafalaya Basin is a large, freshwater overflow swamp containing numerous rivers, streams, lakes and ponds, with the Atchafalaya River representing the largest and most prominent of the basin's many streams. The coastal marshes contain numerous tidal waterways, lakes, bays, lagoons and ponds, while the nearshore waters of the Gulf of Mexico present a vast expanse of shallow marine waters. Because of the sheer amount of water in the region, the movement of peoples and goods here has always depended heavily upon watercraft. As a result, the social, economic, and demographic history of the region has been shaped by water transportation. There is no doubt that aboriginal populations of the region relied upon dugout canoes in their travels through and across the area. Numerous accounts of the use of dugouts by the native populations have been left by early European visitors to Louisiana, and the remains of a number of prehistoric dugout canoes have been found (Pearson et al. 1989). Later in time, European craft such as batteaus, skiffs, luggers, and, eventually, steamboats plied the region's waters and watercraft continued as an important means of transportation until the arrival of railroads and the expansion of overland roadways into the region in the later part of the nineteenth century. Today, the Atchafalaya River and the associated waterways that form the Atchafalaya Basin and the nearshore waters of the Gulf of Mexico continue to be important commercial transportation routes and the smaller streams and lakes of the area are used extensively by fishermen, trappers and visitors.

Thus, untold numbers of watercraft have traveled the waters of the study area since prehistoric times. The numbers lost and which currently exist as underwater cultural resources, also, is assumed to be large. A previous study of waterborne commerce and the potential for sunken vessels within the entire area of the New Orleans District argued that "few other areas in North America equal the New Orleans District in terms of the number and variety of water craft known to have been used. Similarly, the potential for sunken vessels existing as significant cultural resources is certainly higher in the New Orleans District than in most other areas of similar size" (Pearson et al. 1989:19). The study area, as a segment of the New Orleans District which has long been the locus of watercraft use, is certainly reflective of these statements.

Another critical reason for a concern with boat wrecks as cultural resources is related to the types of activities undertaken by the COE within the study area. The Corps' principal efforts within the region are directed toward navigation, flood control, hurricane protection and erosion control. Many of the projects involved with these efforts represent significant construction endeavors resulting in a considerable amount of alteration or removal of land surface, stream banks and stream and canal bottoms. These activities have the potential for adversely impacting shipwrecks. The Federal government has been involved in navigation improvements and flood control in the project area since at least the 1850s, and the state of Louisiana and private individuals were involved even earlier. In the past, one of the major efforts to improve navigation was a concerted effort to remove sunken wrecks from navigable waterways. While the number of wrecks reported to have been removed within the study area is less than in other sections of the New Orleans District, purposeful wreck removal, plus inadvertent removal or damage as a result of other activities, has certainly resulted in adverse impacts to many potentially significant watercraft. While activities directed specifically at wreck and obstruction removal have lessened in recent years, ongoing construction and dredging projects within the study area could impact unknown and unreported boat wrecks. The information presented in this report will provide the COE with some of the data needed to integrate the management of the area's known and unknown sunken vessel cultural resource base within the needs of present and future construction projects.

Research Design

Practical and Theoretical Basis of the Study

The purpose of any research design it to provide a framework which gives structure and direction to a research project. The research design will, at a minimum, specify the goals of the study, the data and variables of interest , and the methods of data collection and analyses considered pertinent to addressing the goals or objectives of the study. The importance of research designs is well understood and has been amply discussed in the archaeological literature (e.g., Goodyear et al. 1978; Gould 1983, Schiffer 1978) and, therefore, will not be extensively discussed here. The discussion, rather, centers on the research design of this particular study in terms of the objectives or goals, the data of interest and the manner in which these data are to be treated in addressing questions of interest. Some of the basic rational for implementing this study have been noted above. The following sections provide more complete discussions on the study in terms of its theoretical basis, the data of interest and the orientation and procedures of research.

The present study was instituted for one principal reason: to satisfy Federal requirements concerning the treatment of cultural resources that will, or may, be affected by activities of the Corps of Engineers within the prescribed study area. Over the past 35 years, a series of laws, rules, and regulations concerned with the preservation of the cultural resources of the nation have been enacted at the Federal level. This body of legislation has arisen as a result of the growing recognition that the nation's cultural resources are being damaged or entirely destroyed at a rapid and constantly growing rate and the recognition that the preservation and protection of some of these resources is in the public interest. It is recognized that these cultural properties are non-renewable resources that provide tangible and intangible information on a past which is if interest to the public as a whole. The fact that regulations concerning the protection and preservation of cultural resources now exist at all governmental levels emphasizes that concern for these properties is widespread.

The theoretical basis of this study is more difficult to define. When structured within a regional perspective, as in this study, compilations of cultural data can probably more readily contribute to the expansion of knowledge within a particular dis-

cipline than if those data are collected piecemeal. This aspect of the study, the systematic collection and organization of knowledge in a manner which permits general explanation, is probably more appropriately considered a reflection of a "theoretical approach" than a "theoretical basis" for the study. Ultimately, the theoretical basis for this study rests on the assumption that the data of concern, boat wrecks, as a population of items in some universe (i.e., the study area), lend themselves to general understanding through systematic examination. Watercraft, as cultural artifacts, are the product of human behavior and, as this behavior is patterned, the function, use, construction, distribution, etc., of vessels, even after they have sunk, is in some way reflective of this behavior. Boats of all types, as archaeological entities as well as floating and operating watercraft, lend themselves to generalization and, thus, understanding (Gould 1983).

Admittedly, because of our limited knowledge of the circumstances of loss for most wrecks in the study area, as well as of the post-depositonal changes to them, it is difficult to extricate many types of behavioral information from their archaeological remains. As Pearson et al. (1989:52) note, it is probably more difficult to assess specific behavioral patterns within broad, areal studies of the type undertaken here, than it is when dealing with a specific shipwreck. This is because the information available on any individual wreck, the basic variable of interest here, is generally limited, often ambiguous or biased, and, normally, impossible to verify. These flaws in the data are, inevitably, inherent in any generalizations drawn from these data. Therefore, caution must be exercised in developing general statements about the wreck population in the study area as well as in assessing these generalizations. It is, however, considered important to attempt these types of generalizations because they can serve as a basis for more reasonable management and treatment of wrecks as cultural resources as well as contribute to general and specific knowledge of human behavior. Information on the various sources examined in the collection of basic data for this study are presented later in this chapter while the final two chapters of this study provide discussions and analyses of the collected data and put forth some general statements about these data.

Study Objectives

The research objectives of this study are established in the Scope of Services provided by the New Orleans District, U.S. Army Corps of Engineers. The Scope of Services identifies several tasks for this study (United States Army Corps of Engineers 1997). Three tasks were identified in the scope as primary. These were: 1) to delineate historic navigation routes or corridors in the study area; 2) to develop an inventory of reported wreck locations in the study area; and 3) to identify high, medium and low probability zones for wrecks for the various waterways of the study area. Several classes of information were examined to assemble the data needed to address these and the secondary tasks outlined in the Scope of Services. One class of information consisted of the navigation history of the area of interest. This involved the collection of information on the area's history of boat use and waterborne commerce, including such topics as the types and numbers of boats used over time, the routes traveled by boats, the patterns of waterborne trade, and the locations of ports and boat landings within the study area. This information provides a beginning point for ascertaining the types and numbers of boats plying the region's waterways and the locations where they traveled, docked and may have been lost or abandoned. A second major class of information examined consists of the actual published record of vessels lost in the area. This record includes accounts that appear in various official documents, newspapers, published works on wrecks and navigation, compiled wreck lists, etc. Reliable and accurate information on vessel sinkings, of course, is the ultimate type of data desired for this study. However, the records on vessel losses are often imprecise and incomplete and, probably most importantly, tend to relate to larger vessels, particularly commercial craft. Records of the losses of small commercial and non-commercial ships, boats, canoes, and pirogues, rarely occur even though we know that very large numbers of these types of watercraft have been lost in the study area. Thus, while the published record of vessel losses is extremely important, it must be recognized that it is biased and incomplete.

In addition to information on the activities and losses of vessels, the region's natural setting and history are examined. Of particular concern are the area's geologic history and past and ongoing geomorphic processes. These are of concern because they have had a direct affect on the history of vessel use in the region and on the potential that sunken vessels will survive as archeological sites. As is discussed in later sections of this report, much of the study area is characterized by rapid geologic change. Within the Atchafalaya Basin, riverine processes have, over

relatively short periods of time, significantly altered the land- and waterscape. Rapid and widespread sedimentation has probably had the most dramatic impact within the Atchafalaya Basin. Channels have shifted course and changed in size, lakes and ponds have formed or expanded as well as filled, areas that were formerly water are now land and vice versa. These changes have been occurring at a fairly rapid rate over the past 200 years or so and have had a direct influence on watercraft usage in the area. The positions of navigation routes have shifted in accordance with channel changes as have the locations of landings. These natural processes have dictated where vessels of various types could have traveled and, thus, where they may have been lost. Similar changes have occurred in parts of the study area outside of the Atchafalaya Basin, but these changes generally have not been as rapid nor as dramatic.

Additionally, natural processes can exert a variety of impacts on lost vessels. Sedimentation rates within much of the study area are extremely high. This, or subsidence, a factor in the coastal marshes of the study area, may bury, and often preserve, a sunken boat. On the other hand, other forces, such as erosion from lateral channel migration or shoreline loss, can physically degrade, damage or totally destroy a sunken vessel. Natural processes and environmental setting have a great influence on the potential for site (i.e., sunken watercraft) preservation and, thus, are an important contributing factor in developing predictive statements about conditions at specific sites as well as in developing more general statements about preservation potentials over broad areas, as is done in this study.

Wrecks as Archeological Sites in the Study Area

Watercraft, as they may currently exist as archeological entities, are the objects of interest of this study. An understanding of a variety of phenomena is required in order to arrive at reasonable conclusions about the archeological population of boat wrecks in the study area. Information on reported wrecks is, of course, the most useful record for reaching conclusions about the archeological population of wreck sites, but, as is discussed later, the number of reported wreck sites in the study area is not large. Even smaller is the number of boat wrecks which have actually been physically examined or verified. Goodwin and Selby (1984) reported on the excavations of the remains of a wooden barge or flat found at Morgan City and Pearson and Saltus (1991) reported on 10 historic watercraft discovered along Bayou Shaffer, most of which were types which can be considered "folk craft." With the exception of a single boat, a wooden World War II mine sweeper reported by Pearson and Saltus (1991:108), the documentary record of loss or abandonment of these boats is nonexistent. This can be anticipated for the majority of the watercraft lost in the study area. They tended to be small, often non-commercial craft whose loss would never appear in any written record. This phenomena has been discussed at length by Pearson at al. (1989) where they note that in a given area the documented record of wrecks, as it appears in various official and unofficial written records, represents an incomplete and biased sample of the losses that actually occurred. Further, the types of vessels mentioned in written accounts is rarely reflective of the actual proportion of the various types that used the area.

Within the study area, as is demonstrated later in this report, there is an obvious lack of written documentation of losses of small craft, such as sailing sloops, which are known to have plied the coast and bay areas in large numbers, and there are almost no accounts of losses of small folk craft, such as skiffs, batteaus or pirogues. The larger commercial vessels, such as steamboats, are the types that tend to be officially recorded or publicly reported when lost. It is apparent, then, that there is a serious discrepancy between the historic record of boat use in the study area and the historic record of boat loss in the area. This discrepancy has important consequences for the management of shipwreck resources in the Atchafalaya Basin. In particular, it means that placing total reliance on the historic record of shipwrecks in the development of management guidelines and in making management decisions will inevitably ignore a large segment of the actual population of wrecks. In an effort to alleviate this problem, this study deals not only with the known boat wrecks in the study area, but with the potential for the occurrence of boat wrecks in the area.

As defined in the Scope of Services, the concern of this study is only with watercraft which date from the period since Euro-American activity in the region. The French were the first Europeans known to have taken boats into the region. The earliest documented French incursion into the region was in 1699, by Jean Baptiste le Moyne, Sieur d'Bienville, the younger brother of the first governor of the Louisiana colony, Pierre le Moyne, Sieur d'Iberville. In this year, Bienville traveled by boat down Bayou

Lafourche intending to examine the country and establish friendly relations with Indians living in the area. Bienville, apparently, traveled down the eastern boundary of the present study area; he did not enter into the study area proper. However, within the next 15 years or so, French officials, trappers and traders were beginning to travel into and through the study area. Travel into the area certainly increased with the establishment of New Orleans on the Mississippi River in 1718. The year 1718, therefore, is designated as the starting date for this study.

The data developed in this study are meant, primarily, to provide the New Orleans District, Corps of Engineers, with information on the occurrence and potential of sunken historic watercraft in the study area. This is done by assessing the distribution, occurrence, density, and potential condition of shipwrecks within the study area. The information presented can be utilized in the management of cultural resources during the design and implementation of COE projects in the study area. This study is intended, also, to be a contribution to the growing body of literature dealing with maritime history, archeology and cultural resources management. This study, additionally, complies with the Louisiana Submerged Cultural Resource Management Plan's goals and objectives for the identification and location shipwrecks. The goals of the state's management plan are "to identify the nature of the resource, to determine potential threats to that resource, and to determine strategies to protect and preserve it." The Louisiana plan suggests that: (1) a data base of shipwreck losses be compiled to understand the extent of the resource; (2) areas where wrecks can be predicted, must be identified; and (3) strategies should be developed to anticipate threats and make recommendations to avert destruction of the resource (Terrell 1990). This study addresses directly the first two of these issues and provides some insights into the third.

Sources of Information

Over the past several years, there have been a number of studies that provide information on prehistoric and historic settlement and use of the Atchafalaya Basin and the coastal area to the south. Of primary concern to the present research are those that provide information on boat use and the history of navigation in the region and on the known or probable occurrence of sunken vessels. In particular, the present effort has drawn upon an earlier study of waterborne commerce and boat wreck potential prepared by the New Orleans District (Pearson et al. 1989). This report, entitled *A History of Waterborne Commerce and Transportation Within the US Army Corps of Engineers New Orleans District and an Inventory of Known Underwater Cultural Resources*, examined the wreck potential within the entire New Orleans District using information on the region's history of navigation, recorded vessel losses and the history of impacts from natural and man-induced processes. The Pearson et al. work also produced a list of 1800 known or reported wrecks within the New Orleans District, a number of which fall within the area of concern here. The present study has relied heavily on this earlier work as a guide.

Probably the best synthesis on human history in the Atchafalaya Basin is found in Jon Gibson's work (Gibson 1982). Other studies resulting from cultural resources management projects provide information on the history of the study area and the surrounding region (e.g., Castille et al. 1990; Goodwin et al. 1985a, 1985b, 1986; and Kelley 1988). In addition, a large body of literature is available the deals with the Acadians of south Louisiana who constituted the largest Euro-American population in the study area during most of the period of concern. Of particular pertinence are the works that deal with Acadian life in the Atchafalaya Basin (e.g., Comeaux 1972, 1978, 1985; Conrad 1978; Knipmeyer 1956). Details on the human history of the Atchafalaya Basin can be found in the works referenced above.

Several other works include discussions of watercraft and navigation in the Atchafalaya Basin area, particularly Castille et al. (1990) and Goodwin et al. (1985a and 1986). Pearson and Saltus (1989) conducted a remote-sensing survey and diving project at Blue Point Chute and American Pass, two locations along the Atchafalaya Main Channel above Morgan City. Additionally, they undertook remote-sensing survey and diving at locations along the Atchafalaya Basin Main channel and along Bayou Shaffer in St. Martin and St. Mary parishes (Pearson and Saltus 1991). Several small folk craft, a sailing lugger and a coal barge, most of which were buried by sediment and/or submerged, were discovered in this latter study. The existence of these craft, plus their excellent state of preservation, are illustrative of the many similar situations likely to be found in the study area. Many of the field techniques used in the Pearson and Saltus study are applicable to future research in the area.

Archival sources for waterborne commerce and transportation can be found in a number of archives in the region. There are several university libraries with notable collections, and city, state and national repositories. Of course, the National Archives in Washington, D.C. is a major source for documents such as enrollments and registrations, deck logs for naval vessels and information in various record groups concerning watercraft. One very valuable source on Civil War vessels is Record Group (RG) 109, a collection of "Papers Pertaining to Vessels of or Involved With the Confederate States of America," better known simply as the "Vessel Papers." Original enrollment documents for vessels are also found in the National Archives in the records of the Bureau of Marine Inspection and Navigation (hereinafter cited as BMIN) in Record Group 41.

The closest National Archive branch to the study area is located in Fort Worth, Texas, which has a large collection of the Quartermaster General (RG 92) records. The most significant collection of documents dealing with court records is found in the records of the United States District Court and Circuit Courts of Appeal of New Orleans (RG 21). The court records are valuable because of the detail of information they contain on vessels, particularly loss of cargoes, failure to pay for repairs, information from sale of vessels, damages due to collisions and claims for injuries. There are four locations for major sources of information in New Orleans; the New Orleans Public Library, the Historic New Orleans Collection, the Notarial Archives and the Howard-Tilton Library at Tulane University.

The New Orleans Public Library holds records of the City Archives, which contain documents dealing with city business as a port. These include records pertaining to collection of levee dues assessed on vessels to preserve the waterfront levee from damage caused by the loading and unloading of cargo. The Public Library also has records from the Wharfinger, which include registers of vessels arriving in port. These registers list information on arriving vessels, including the date of arrival; the origin, name, and master of the ship; its tonnage and cargo and the levee dues charged. The New Orleans Notarial Archives holdings include various contracts submitted before Notary Publics in the city. Many of these are Acts of Sale that deal with steamboat ownership, shipping and vessel construction. There are also files of documents known as "Protests," which are legal documents reporting damages to vessels, cargo or personal injuries. The Historic New Orleans Collection contains an excellent map collection and the steamboat collection of Leonard Huber. The Howard-Tilton Library at Tulane University has various holdings relating specifically to steamboat history; including a collection of material from Captain William Tippit, the Captain T.P. Leathers papers, the Captain F.L. Wooldridge Collection, a scrapbook by Captain Sam G. Smith and the Joseph M. Jones Steamboat Collection. Many of these collections contain original materials associated with the steamboat business, including certificates, examination books, and insurance policies. Some of the records in these repositories proved pertinent to the present study, others did not.

Other valuable sources of data on the navigation history and watercraft in the study area are located in Baton Rouge. The Louisiana and Lower Mississippi Valley Collections (hereinafter cited LLMVC) in Hill Memorial Library at Louisiana State University in Baton Rouge has nineteenth century photographs of steamboats by local resident Andrew Lytle, as well as two source documents produced by the Work Projects Administration in the 1930s and 1940s. One consists of the records of the United States Customs District, Port of New Orleans from 1873 to 1924. Entitled *Record of Casualties to Persons and Vessels On the Mississippi River, Its Tributaries, on Lakes and other Waterways* it contains lists of lost or damaged vessels, their owners, masters, dates and locations of incidents and remarks (Work Projects Administration [hereinafter cited WPA] 1938). The second set of documents is the multi-volume work entitled *Ship Registers and Enrollments of New Orleans, Louisiana* for the years 1804 to 1870 (WPA 1942). These volumes represent a listing of approximately 8000 vessels; including keelboats, flatboats, barges, schooners, brigs, steamboats, and ships that were enrolled or registered at New Orleans. Information contained in the volumes includes the name of the vessel, where it was built, dimensions, some physical characteristics, the names of owners and masters and, sometimes, miscellaneous information such as mortgage costs, a statement of loss, etc. The Louisiana and Lower Mississippi Valley Collections also contain family papers, journals, etc., that deal with aspects of waterborne commerce and travel in the study area. Another source for vessel information is the Louisiana State Archives in Baton Rouge. A particularly valuable holding pertinent to steamboat activity are the Captain Oramel Hinkley & Family Papers (1839-1868) which consists of logs and account books of several Hinkley steamboats, some of which operated within the study area. Addition-

ally, there are published lists of steamboats and steamboat losses which provided useful information. The most important of these are what is known as the "Lytle-Holdcamper List," entitled *Merchant Steam Vessels of the United States, 1790-1868* (with supplements) (Mitchell 1975) and *Ways Packet Directory*, 1848-1994 (Way 1994).

Another report that deals with submerged cultural resources in the study area is *Historic Shipwrecks and Magnetic Anomalies of the Northern Gulf of Mexico* by Garrison et al. (1989). This study is concerned specifically with the outer continental shelf, but also includes Louisiana's coastal waters and provides information on the locations of known wrecks as well as defines areas of varying probability relative to the existence of wrecks. It is the most comprehensive study of shipwrecks in the Northern Gulf of Mexico. Pearson and Hoffman (1995) report on the history and archeology of the eighteenth century Spanish merchantman, *El Nuevo Constante*, which sank in shallow waters of the Gulf of Mexico just to the west of the present study area. Excavations of the wreck revealed the existence of well preserved vessel structure in addition to a wide variety of ship's fittings and cargo items. The *Nuevo Constante* provides evidence that vessels lost in the near shore Gulf can be well preserved and can produce valuable and significant information on a variety of maritime-related topics.

While outside of the study area, *Evaluation of the National Register Eligibility of the M/V Fox, An Historic Boat in Lafourche Parish, Louisiana* by Goodwin et al. (1984) provides an example of the level of effort and detail in recording vessel structural information that can, and should, be achieved for an individual boat. The reports, *A Reconnaissance Survey of Derelict Boats on Bayou DuLarge, Terrebonne Parish, Louisiana* by Stout (1992) and *Documentation of Several Historic Vernacular Watercraft on Bayou DuLarge, Terrebonne Parish, Louisiana* by Goodwin et al. (1995) are examples of studies that evaluate and document vessels in their historic context. The research design developed for the latter study involved documentation of shipbuilding design and technology. This included intensive on-site recordation of older and largely intact vessels that represent traditional regional types. This is noteworthy, because it offers comparative data for the archeological record.

An important work dealing with the geological history and geomorphology of the study area is the 1986 study produced by the New Orleans District entitled *Geomorphological Investigation of the Atchafalaya Basin, Area West, Atchafalaya Delta, and Terrebonne Marsh.* (Smith et al. 1986). This research provides the most comprehensive recent analysis of the region's geomorphology and has been extensively drawn upon here. Finally, in another study undertaken by the New Orleans District, Weinstein and Kelley (1992) in *Cultural Resources Investigations in the Terrebonne Marsh, South-Central Louisiana*, present an inclusive discussion on the geomorphic history and paleogeography of the Terrebonne Marsh area. Their work is mainly concerned with the prehistoric archeology of the region, but it has some relevance to the present study.

A particularly valuable source for historic information on navigation, navigation improvements and wrecks are the Annual Reports of the Chief of Engineers (hereinafter cited Chief of Engineers [CE]). These reports were submitted to Congress yearly by the Chief of the Corps of Engineers and provide information on the various activities of the Corps, the expenditures on various projects, the commerce on various routes of navigation, etc. The Annual Reports are used extensively in this study.

Historic Contexts

One of the requirements of the Scope of Services for this study was to identify relevant "historic contexts." The term "historic context" refers to the grouping of resources defined by theme, geographic limit and chronological period and it represents an important element in the management of cultural resources. The United States Department of the Interior (USDI) has developed specific statements about how historic contexts are to be used in the preservation planning process. Their Standards and Guidelines for Archeology and Historic Preservation state:

> Decisions about the identification, evaluation, registration, and treatment of historic properties are most reliably made when the relationship of individual properties to other similar properties is understood. Information about historic properties representing aspects of history, architecture, archaeology, engineering, and culture must be collected and organized to define these relationships. This organizational framework is called an "historic context". The historic context organizes information based on a cultural theme and its geographical and chronological limits.

> Context describes the significant broad patterns of development in an area that may be represented by historic properties. The development of historic contexts is the foundation for decisions about identification, evaluation, registration, and treatment of historic properties [United States Department of the Interior n.d.].

The Guidelines go on to state that a series of preservation goals should be systematically developed for each historic context. These goals are to be prioritized and integrated into the overall preservation planning effort for a given geographic area. Pearson et al. (1989) presented a series of historic themes or units around which discussions of historic navigation within the entire New Orleans District could be developed. These themes actually are chronological time periods defined on the basis of several criteria, including major technological changes in watercraft construction or propulsion and significant historical events or trends (e.g., founding of New Orleans, the Civil War, etc.). However, within each time period there is sufficient similarity in terms of the types of vessels used and the patterns of trade and commerce followed to make the periods meaningful units for discussing navigation history and wrecks as archeological entities. For the state of Texas, Arnold (1989) has developed similar historic contexts relevant to shipwrecks, although his contexts (actually "subcontexts") are defined on the basis of both chronological time period and vessel type. These two studies provided guidance for developing historic contexts for the present endeavor.

The present study is actually concerned with what can be identified as a single, though rather broad, historic context; historic navigation within the Atchafalaya Basin and adjacent areas. The topic of navigation during the historic period in the study area does constitute a "cultural theme" and it has geographical and chronological limits. However, sufficient information is presently available to permit subdivision of this broad historic frame into more meaningful and manageable units. For the present study, three units or "historic contexts" are identified. These are: 1) The Early Years of Navigation, 1718-1812; 2) The Era of Steam, 1812-1936; 3) Navigation in the Modern Era, post 1936. All of these contexts have the same geographical boundaries; i.e., the spatial boundaries of the study area. The three historic contexts are distinguished, primarily, on the bases of significant technological changes in watercraft propulsion. However, within each context there are similarities in terms of the types of watercraft used, the types of cargoes carried, the general patterns of trade, etc., that are sufficient to distinguish each context from the other. As is discussed in more detail later, there is also considerable overlap among the historic contexts in many areas pertinent to historic navigation. For example, the introduction of steamboats into the study area in the second decade of the nineteenth century did not mean an end in the use of older types of watercraft. Most of the previously used watercraft continued to be employed, although the importance and numbers of some decreased as they were replaced by steamers and others, such as the keelboat, disappeared entirely. These contexts are meant, primarily, to provide a convenient framework for organizing data on the navigation history of the study area and for addressing questions about those data. They certainly do not represent all of the historic contexts relevant to the study area; these are almost infinite in number. However, based on our present state of knowledge about the study area, these three contexts provide a legitimate starting point for developing meaningful questions about the area's navigation history; for associating and discussing watercraft and watercraft use pertinent to that history; and for assessing and evaluating watercraft which may exist as archeological remains within the study area. The primary goal in developing these historic contexts is to assist cultural resources managers in developing appropriate priorities and establishing strategies for research and preservation activities as they relate to watercraft properties that may exist within the study area.

These three historic contexts provide the framework for organizing discussions of navigation history, wreck occurrence, and wreck significance that are presented in later sections of this report. Within the framework of the historic context and the known shipwreck potential of the area, several research questions are appropriate for this study. Those which are addressed are:

1. What is the nature of the archeological record of shipwrecks relative to the historic record of vessel use and loss in the study area?

2. To what extent and in what ways did the development of waterborne transportation influence settlement in the area?

3. How do the kinds of cargoes carried

by watercraft reflect local and regional economies?

4. How have vessel types and their utilization changed over time within the region, and what factors influenced variations in vessel types and patterns of use?

5. How do the specific environmental and cultural attributes of the region affect the local tradition of boat use and construction?

Another important issue in describing watercraft and historic navigation routes is the issue of "navigability." Prior to the 1930s, officially recognized navigability was normally determined by steamboat or schooner travel. Commercial usage by small watercraft such as keelboats, flatboats, skiffs, batteaus and pirogues was not considered the standard (Castille 1993:267-268). In the project area, these smaller craft often operated on narrow and very shallow waterways which were too small to accommodate steamboats and, therefore, were not officially considered navigable by the Corps of Engineers. Thus, it cannot be assumed that all commercial watercraft were restricted to using only identified "navigable" waterways nor that the archeological record of wrecks is confined to these waterways.

The Study Area

The study area (Figure 1-1) consists of the "Lower Atchafalaya Basin Reevaluation Study Area" and is defined (as per Scope of Work) by the following boundaries: northern - US Highway 190; southern - three mile limit in the Gulf of Mexico; eastern - west bank of the Mississippi River to Donaldsonville, then west bank of Bayou Lafourche to Thibodaux, then west bank of Bayou Terrebonne to Houma, then Houma Navigation Canal to Gulf of Mexico; and western - east bank of Bayou Teche to Jeanerette, then Iberia/St. Mary Parish line to Gulf Intracoastal Waterway (GIWW), then GIWW to Freshwater Bayou Canal, then Freshwater Bayou Canal to Gulf of Mexico.

Report Organization

Chapters are arranged and organized to reflect elements contained in the Scope of Work. The natural setting of the study area is examined in Chapter 2, including discussions of those geomorphic processes that most influence wreck location and preservation. The navigation history of the study area is examined in Chapter 3. Wreck data and discussions on various navigation routes through the study area are presented in Chapter 4. Chapter 5 presents syntheses and interpretations of the collected data collected and provides information and recommendations relevant to future management of wrecks within the study area.

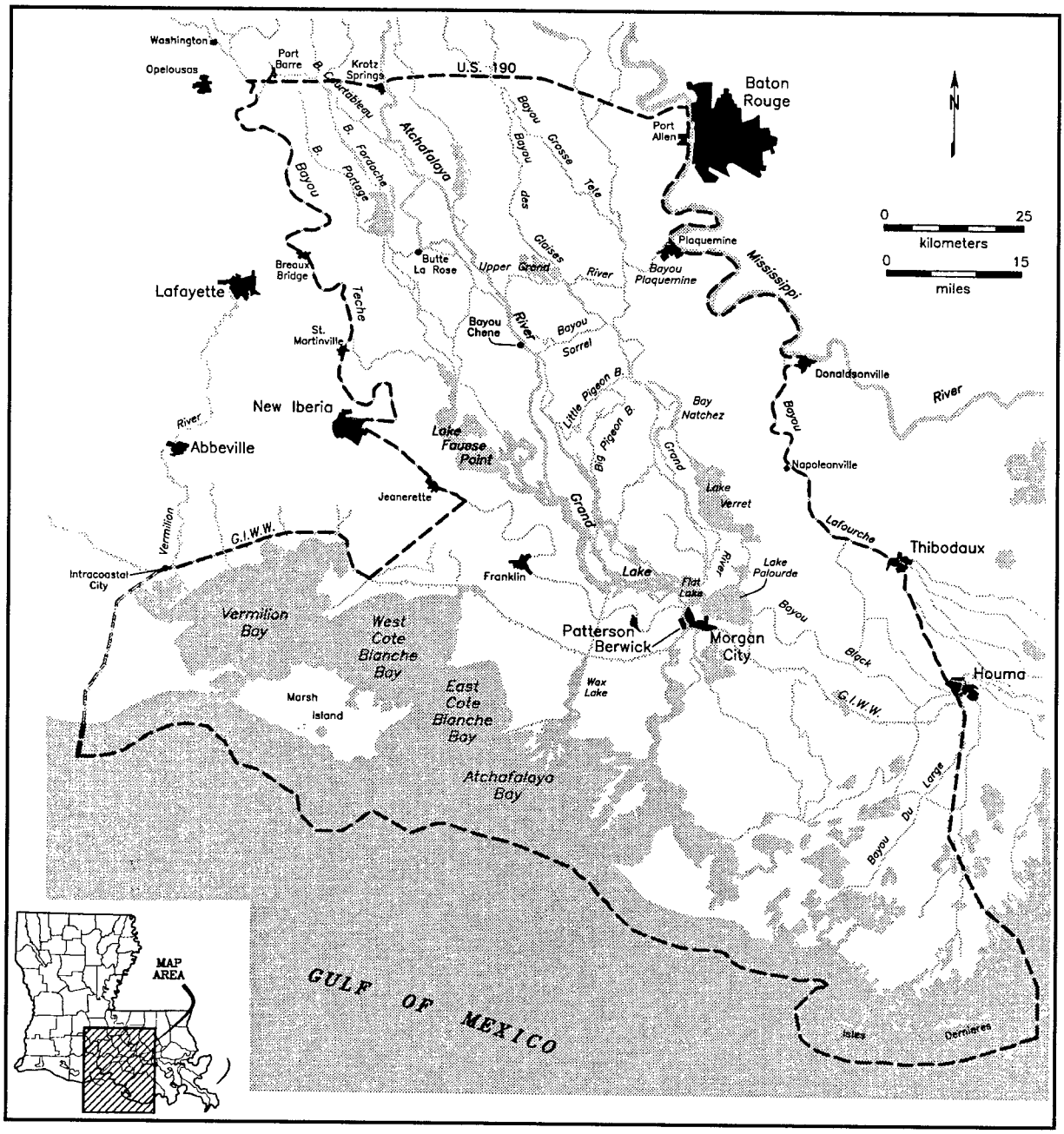


Figure 1-1. The study area, showing principal communities and waterbodies.

CHAPTER 2

NATURAL SETTING OF THE STUDY AREA

The Geological Setting

The study area falls within the Mississippi River delta plain, a massive wedge of alluvial and deltaic sediment extending for almost 200 mi (320 km) along the coast of Louisiana and over 65 mi (100 km) inland. While the 3-mi-wide (4.8 km) offshore segment of the study area is not technically within the delta plain, it is underlain by deltaic landforms deposited during periods of lower sea level. A major portion of the study area consists of the lower Atchafalaya Basin, the largest overflow swamp in North America. The basin is a large, shallow depression bounded by present and former Mississippi River courses. To the east are the present course of the Mississippi and the relict Bayou Lafourche course. To the west is Bayou Teche, another relict course of the Mississippi River, that was occupied by the Mississippi from about 5800 to 3900 years B.P. (before present) and subsequently by the Red River until about 1800 or 1900 years ago (Kelley 1988:15). Just south of the Atchafalaya Basin are estuarine coastal marshes containing vast areas of saline, brackish and fresh marshes, large saline and brackish bays, and coastal lakes, beach ridges and barrier islands. This area is now underlain by deltaic landforms and contains some still-exposed deltaic features, primarily relict natural levee ridges. Specifically speaking, the natural levees of Bayous Teche and Boeuf at the Morgan City locale mark the southern boundary of the Atchafalaya Basin, however, the geological history, natural setting, and historical background of the coastal marsh area and the basin are sufficiently similar to be considered together. The offshore zone consists of a shallow marine environment.

The geologic history of the delta plain is related to a sequence of episodes of delta building and deterioration resulting from the progradation and subsequent abandonment of the present and former Mississippi River courses and deltas over the past 9,000 years or so. Thus, the Mississippi delta plain is a composite geomorphic feature consisting of numerous coalesced delta complexes and all near-surface landforms in the area have been formed within the past 9,000 years. The developmental history of the delta plain has been well studied (e.g. Fisk 1952, Fisk and McFarlan 1955; Frazier 1967) and the geological and geomorphic processes responsible for the evolution of the Atchafalaya Basin, which comprises the major portion of the study area, are generally well known (see Smith et al. 1986). The geological history and the scope of environmental change of the study area since the arrival of European populations is prerequisite to understanding the nature of all archeological and historic site distributions and occurrences in the study area, including wrecks. The recent history of the geologic development of the study area is briefly discussed below, with the emphasis placed on the lower Atchafalaya Basin.

The Atchafalaya Basin

The Atchafalaya Basin is a physiographic lowland between active and abandoned meander belts of the Mississippi River (Figure 2-1). The long axis of the basin trends northwest to southeast, and extends approximately 120 mi (193 km) from the Old River diversion at the Mississippi River to the Gulf of Mexico. The distances across the basin average 45 mi (72 km). Inspection of the geomorphic features reveals a landscape that is the product of annual floods, and less frequent, catastrophic events modified by human activities during the past 150 years. Numerous studies discuss and describe the geology of the basin (Fisk 1952; Fisk and McFarlan 1955; Frazier 1967; Krinitzsky 1970; Krinitzsky and Smith 1969; Saucier 1994), with Smith et al. (1986) providing the most recent and complete summary.

The Atchafalaya Basin extends from above Krotz Springs, Louisiana, in the north to Morgan City, Louisiana, in the south and consists primarily of freshwater swamps and numerous shallow lakes. Land surfaces in the region are flat and elevations range from 0 to about 50 ft (0 to 15 m), though most are generally less than 15 ft (5 m). The upper, modern surface deposits of the Atchafalaya Basin are underlain by thick strata of sediments laid down by fluvial processes during the past 8,000 to 10,000 years. These underlying deposits consist of two major units: a basal unit, known as the substratum, and an overlying unit known as the topstratum (Smith et al. 1986:41). The basal unit consists of coarse sands and gravels deposited during rising seas after the last Pleistocene glaciation, while the topstratum consists predominantly of sandy clay, silty clay, clay, and peat facies in backswamp, lacustrine, and lacustrine delta environments (Krinitzsky 1970; Krinitzsky and Smith 1969). The stratigraphic and lithologic evidence reveals that the basin was occupied by shallow lakes and backswamps throughout most of the Holocene (Smith et al. 1986:42).

Three major events during the past 2,000 years have been largely responsible for the present physiography of the Atchafalaya Basin, although significant changes have occurred within the past 100 years (Smith et al. 1986). Initially, the area now occupied by the Atchafalaya Basin was an estuarine interdistributary basin with seawater exchange through

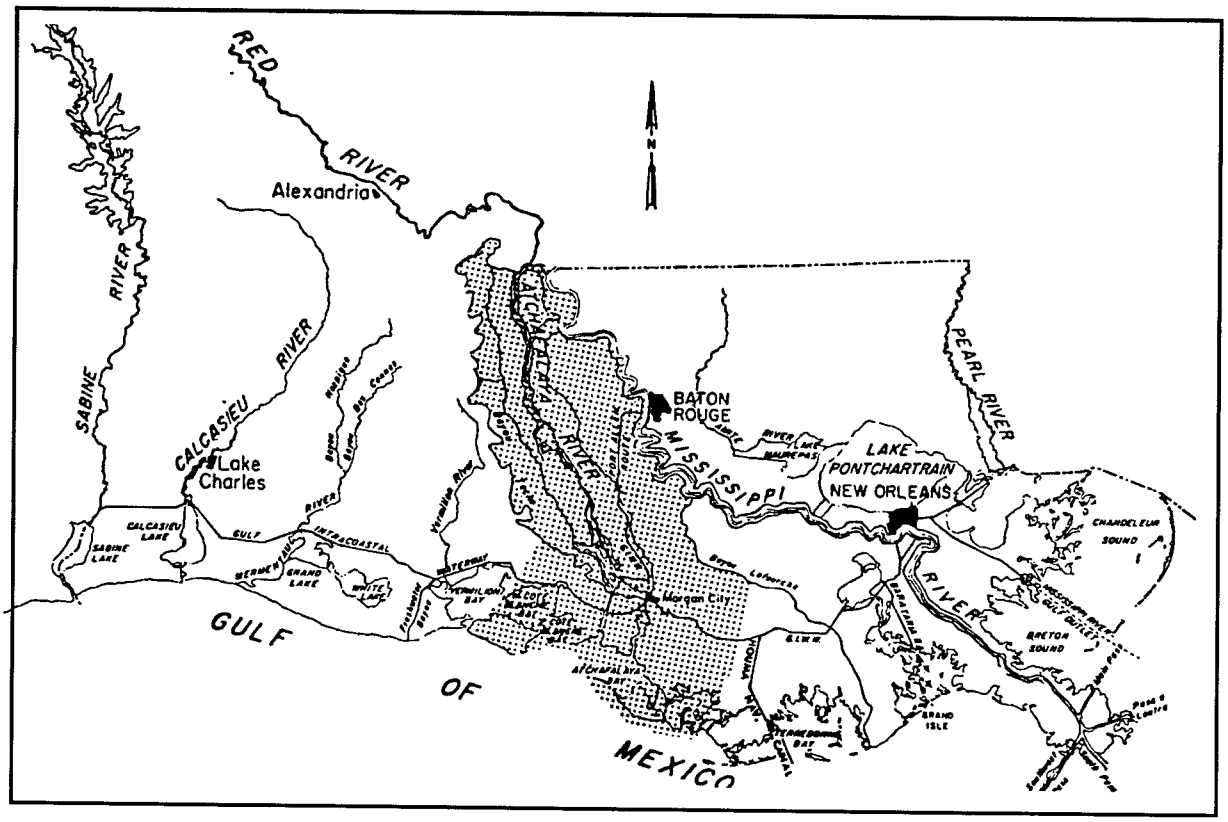


Figure 2-1. Locational map showing the Atchafalaya River Basin (Castille et al. 1990:7).

a southern opening between present-day Morgan City and Houma. Sometime between 1500 and 2000 years B.P. this tidal pass(es) closed with the progradation of a deltaic distributary into the area. Known as the Little Bayou Black-Bayou du Large distributary network, this system extended to the area of the natural levees of Bayou Teche, the relict Mississippi River course which bounded the basin on the west. As a result, an extensive system of shallow lakes was formed in the southern half of the now-impounded estuarine basin, creating subaqueous centers of deposition. During its early history, this system of lakes was quite expansive. Using archeological site data and historical cartographic sources, Smith et al. (1986:45) postulated that the maximum up-basin extent of the prehistoric lake boundary was at Upper Grand River, about 70 km above Morgan City. At some point in time, the impounded water topped and cut through the natural levees of the Teche course at the locations of the present communities of Patterson and Morgan City. The opening at Morgan City remains today as the outlet for the Atchafalaya River.

Significantly different natural processes were active in the northern part of the basin. Along the active river channels periodic overbank flow and crevassing resulted in the transmission of suspended and bed material into the interdistributary basin, gradually raising the elevations of the land surface. Natural levees, channel fill, and backswamps dominated the landscape (Castille et al. 1990:14).

The basin remained as two distinct zones until about 500 years ago, when the second major event in the physiographic evolution of the Atchafalaya Basin occurred. At this time, the Mississippi River migrated to a new course at Turnbull Island, about 80 km (50 mi) north of Baton Rouge. In response to the actions of the Mississippi, the position of the mouth of the Red River changed and an embryonic Atchafalaya River was created. Increasing quantities of water and sediment flowed from the Mississippi into the Atchafalaya, creating a major distributary. The greater amounts of sediment-laden water resulted in infilling and the creation of more extensive areas of dry land in the northern half of the old estuary, such that the original two zones began to coalesce.

Lakes continued to cover much of the lower portion of the basin into the twentieth century. Figure 2-2 presents a detail from an 1829 map depicting the amount of open water in the lower basin at that time. Figure 2-3 presents a detail from an 1884 map of the area showing almost the same amount of open water, suggesting little loss of open-water habitat in the lower basin during the nineteenth century. Lakes in the lower basin area include Lake Fausse Point, Grand Lake, Six Mile Lake, and Lake Palourde.

The final factor contributing to the formation of the modern Atchafalaya Basin consisted of a series of man-produced activities undertaken since the third decade of the nineteenth century. These various activities have been directed, primarily, at improving the navigability of various streams in the Atchafalaya Basin and at flood control. These included the clearing of a large log raft at the head of the Atchafalaya River and dredging in the upper parts of the river beginning in 1839 to accommodate commercial navigation; the establishment of the basin as a flood control project in 1928, and the subsequent construction of guide levees and water control and navigation structures; the construction of levees; dredging; and, in 1963, construction of the Old River Control Structure. This structure has served to regulate flow into the basin at 30 percent of the Mississippi River discharge, and, also, is intended to prevent capture of the Mississippi River flow down the Atchafalaya Basin.

As a result of these man-induced changes, sedimentation within the restricted, artificial flood basin has increased dramatically. Low-lying levees and swamps have been covered by several feet of sands, silts, and clays, and subaqueous environments filled by prograding lake deltas and the creation of islands and bars. This massive influx of material has taken place during a very short period of time. Smith et al. (1986) estimated that 85 percent of the lake system in the southern part of the basin has filled since 1900, and the larger lakes would be completely filled by the year 2000. Considerable infilling has occurred since Smith et al. made their estimates, but not to the extent that they had postulated.

Once the sediment trap provided by the lakes in the Atchafalaya Basin had become largely filled, a locus of sedimentation and active delta formation developed in Atchafalaya Bay. By the early 1950s, a subaqueous delta began forming in Atchafalaya Bay at the mouths of the Lower Atchafalaya River and at Wax Lake Outlet, an artificial channel located about 16 mi (25 km) west of Morgan City (Saucier 1994). A subaerial lobe began to form in 1973 and has expanded rapidly due to several major flood events on the Mississippi River, which put large amounts of sediment into the Atchafalaya River system. Saucier (1994:285) notes that the Atchafalaya Delta repre-

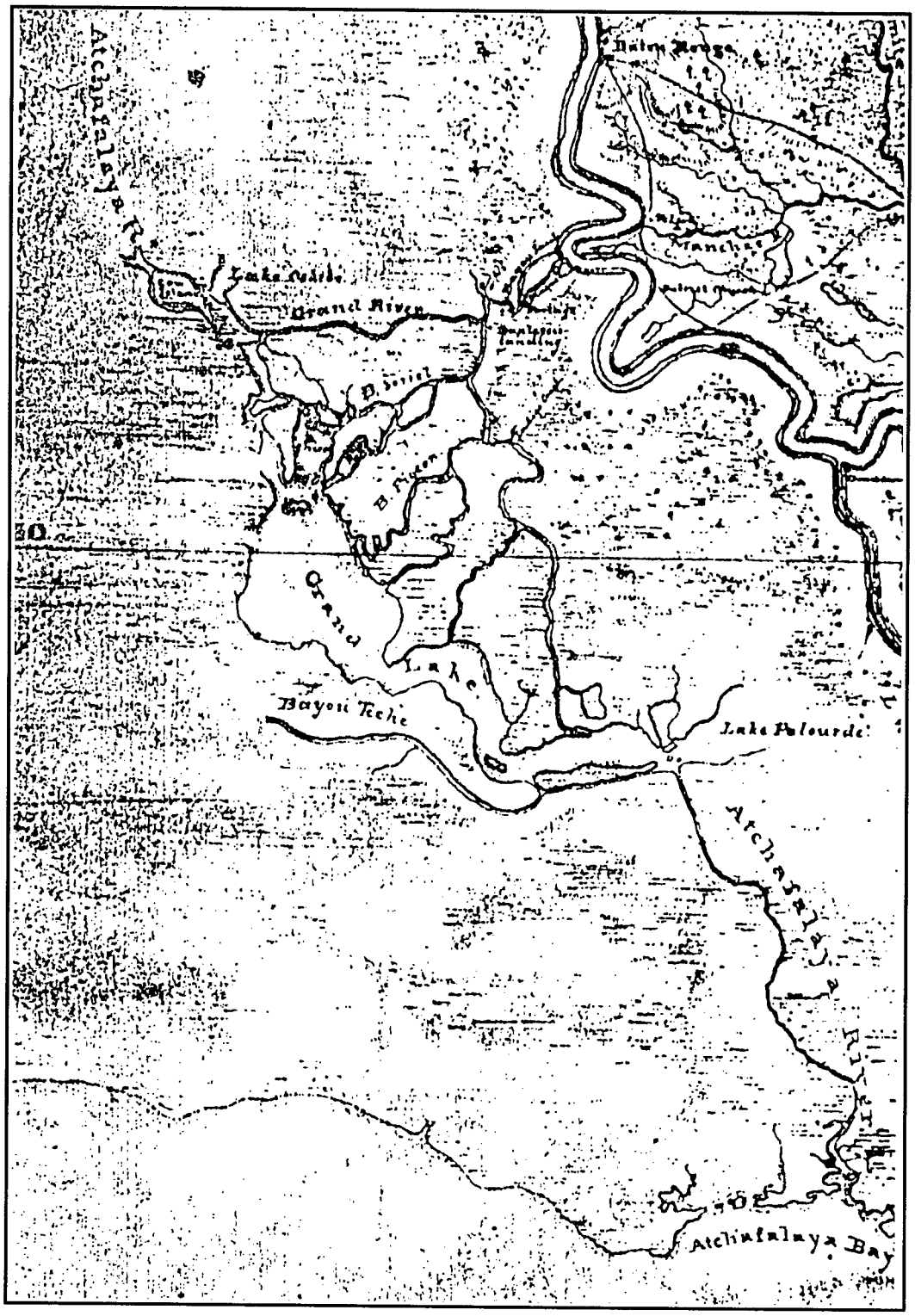


Figure 2-2. Detail of 1829 map showing lake conditions in the lower Atchafalaya Basin in the early nineteenth century (Swift 1829).

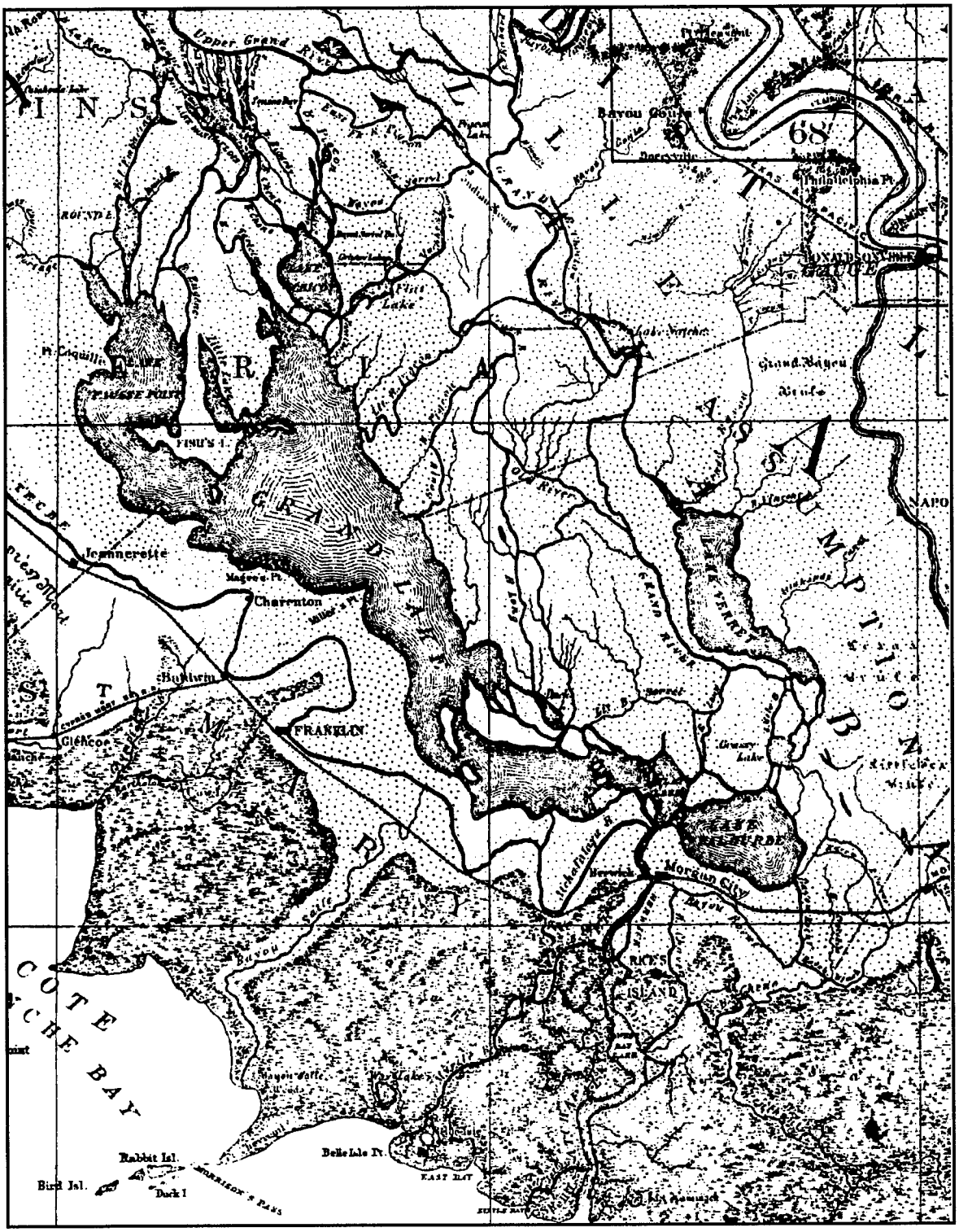


Figure 2-3. Detail of 1884 map showing lake conditions in the lower Atchafalaya Basin in the late nineteenth century (Mississippi River Commission 1884).

sents the only geomorphic event of its type and scale to occur in the Mississippi Valley area in recent times and, as a result, it has been studied in detail. Because of the development of the Atchafalaya Delta and the large amounts of sediment being dumped into Atchafalaya Bay, the area immediately around the bay is the only location on the Louisiana coast currently experiencing an expansion of intertidal marshes. However, as Saucier notes (1994:285), delta formation will continue to take place in deeper water and there will be a decrease in the sediment being put into the bay because COE efforts to channelize the Atchafalaya River have ended and the stream has begun to stabilize. It is apparent from the foregoing discussions that the Atchafalaya Basin is undergoing dramatic physiographic modification and will continue to do so in the future.

The Coastal Zone

A fairly large section of the study area consists of interdistributary and intertidal swamps and marshes. This includes, primarily, the area south of Morgan City. Most surficial landforms here are associated with the abandoned Lafourche (or Lafourche-Terrebonne) delta complex. The most recent geological evidence indicates that the Lafourche-Terrebonne delta complex began as a distributary (present-day Bayou Lafourche) off the main trunk of the Mississippi River in the vicinity of Donaldsonville, Louisiana, approximately 1500 years ago (Tornqvist et al. 1996). This date is later than that proposed by earlier geological studies, but is in line with currently available archeological data from the Lafourche-Terrebonne region (Pearson and Davis 1995; Weinstein and Kelley 1992). Possibly after only 500 years or so of progradation, flow into the Lafourche-Terrebonne system from the main trunk of the Mississippi River began to decrease and, soon, the system began to deteriorate. During this relatively short 500-year time span the Lafourche-Terrebonne deltaic system had expanded from the Mississippi River southwest to about the area of present-day Atchafalaya Bay. Several now-relict channels that were components of the Lafourche-Terrebonne system are extant in the southernmost part of the study area. These include Bayou Petit Caillou, Bayou Terrebonne and Bayou du Large. Some of the other major channels in the lower study area, such as Bayous Black, Shaffer and Chene were formed at an earlier date as a part of the Tech delta complex (circa 3900 to 5800 years B.P.), but they were reoccupied by waters of the Lafourche-Terrebonne delta as it prograded into the area.

Variability in this coastal marsh zone is largely related to changes in salinity. The areas with the least salinity can be classified as swamp or freshwater marsh which grade into brackish-water marsh and, finally, into saline marshes. This gradation occurs in a generally north to south direction in the study area. Freshwater swamps are poorly drained areas, generally bordered by natural levees, many of which are relict features in the southern part of the study area, that support swamp-forest communities. This environment is generally confined to the area immediately south of the Atchafalaya Basin proper and along some of the larger relict distributaries extending farther south. Freshwater, brackish and saline marshes comprise the majority of the area south of Morgan City. They are flat and low-lying and characterized by large expanses of grasses, numerous streams, lakes, ponds, and particularly near the coast, large saline bays. The largest of these bays is Atchafalaya Bay; others are Fourleague Bay, East Cote Blanch Bay and West Cote Blanch Bay. All of these bays are characterized by shallow water and numerous oyster banks and reefs. Atchafalaya Bay, in particular, contains numerous oyster banks that constituted serious impediments to navigation prior to the construction of navigation channels through the bay. As noted earlier, the only elevated surfaces in this area consist of the natural levees of relict distributaries and some beach dune features at the immediate coast. Active and abandoned beaches constitute a minor portion of the study area. These beaches are located along the present Gulf shoreline and have formed through marine erosion of deltaic deposits. Presently, they are poorly developed and actively retreating.

Several barrier islands are located in the study area. The eastern boundary of the study area follows the Houma Navigation Channel through Cat Island Pass, a shallow-water pass extending between two barrier islands, Timbalier, which is east and outside of the study area, and Wine Island, historically part of the Isles Dernieres (Last Islands) which fall within the study area. Today, Wine Island is almost completely gone, exposed primarily during periods of low water. The Isles Dernieres were formed by the erosion of the Bayou Petit Caillou headland and beach ridges over the last 600 to 800 years (Williams et al. 1992:4). Landforms developed into continuous duned terraces and spits on the downdrift ends of the islands. The Isles Dernieres are defined as "laterally-migrating, flanking barrier islands built by recurved spit processes" (Williams et al. 1992:4). The Timbalier Islands, located just east of the study

area, are slightly younger, having been created over only the last 300 years as erosion from the Caminada-Moreau Headland at the mouth of Bayou Lafourche supplied sand for their development.

Louisiana leads the nation in the loss of its wetlands and in coastal erosion. The physical processes that cause land loss are complex and there is much debate and controversy within the technical and academic community over which cause is the most significant and on which measures would alleviate coastal land loss (Williams et al. 1992:1). However, a variety of natural and man-induced factors can be identified as contributing factors to the loss of land in the coastal portion of the study area. These include the natural processes of subsidence, relative sea level rise and resulting bankline erosion. These processes enhance salt water intrusion which can kill off brackish and freshwater vegetation. Loss of vegetation, in turn, accentuates erosion and land loss. Natural processes have been augmented by human activities, such as canal construction which provides avenues for salt-water intrusion and levee construction which can prohibit land-forming sediment from reaching and replenishing backswamps and marsh. In a survey report examining Bayou Terrebonne in 1880, it was noted that the mouth of Bayou Petit Caillou had previously been at Caillou Island, well seaward of the mouth at that time. It was noted that in 1850 the bayou ran between narrow strips of sea marsh between Timbalier Bay and Terrebonne Bay. By the time of the survey in 1880, this area of marsh had broken up into isolated grass islands by the action of waves (CE 1880:1180). Trips from Montegut to Caillou Island by land were common at one time and there was a lighthouse and even a hotel on the island (Guidry 1985:37).

The processes of subsidence and erosion are continuing and more and more fast lands are being eroded and, like the marsh, the form and content of the barrier islands are constantly changing as well as being removed. This trend of beach erosion along the barrier islands in Terrebonne and Lafourche parishes has been recorded in a comparative study by Williams et al. (1992). The study found that, on the whole, Louisiana's barrier islands have decreased by more than 40 per cent on the average and some islands have lost 75 per cent of their areas within the past 100 years. The Isles Dernieres, located in the study area, have the highest rate of coastal erosion in the state. Between 1890 and 1988 most of the central arc of Whiskey Island had eroded, as well as a large portion of Wine Island (Williams et al. 1992:2). The present trends in land loss are expected to continue in the future.

The Offshore Area

Also included in the study area is the offshore area of the Gulf of Mexico, extending out to a distance of 3 mi from shore, encompassing the area falling under the jurisdiction of the Corps of Engineers. This offshore area is a shallow water, marine environment characterized by a generally sandy to muddy bottom which slopes gently toward the south. Water depths at the three-mile limit, generally, vary from about 7 ft to 15 ft. However, off of Isles Dernieres in the southeastern corner of the study area, water depths at the three-mile limit are somewhat greater, ranging from 20 to 25 ft . The principal natural processes operating in this area which might influence shipwrecks as well as their preservation are related to current and wave activities, generated by winds or associated with larger Gulf-wide current systems and, also, with outflow from the Atchafalaya River through Atchafalaya Bay. The major wind patterns in the region are seasonal. Winds typically blow from the southwest during the summer, shifting to the northeast during the winter (Garrison et al. 1989). The winter pattern is frequently interrupted by southward moving cold fronts known as "northers." Wave heights in the Gulf of Mexico are typically 1-to-1.5-m high. Winds and storms, however, can create waves as high as 4.0 m. The northers which periodically move across the Louisiana Gulf coast during the winter sometimes produce rather severe weather, creating conditions which can be hazardous to vessels. Hurricanes, however, represent the most dangerous of the storms effecting the study area and a number of vessels are known to have been lost on and near the coast in this region during these storms (Pearson et al. 1989).

The mouth of Atchafalaya Bay represents the principal opening into the offshore portion of the study area. This bay provided access to the Atchafalaya River from the Gulf of Mexico and has been heavily traveled by a variety of waterecraft during the entire historic period. Atchafalaya Bay is a large, shallow water embayment fed by the Atchafalaya River. Water depths in the bay are generally 6 to 7 ft. However, as noted earlier, the bay contains numerous oyster banks where the water is much shallower. One of the largest of these banks is known as the Point au Fer Shell Reef which extends almost entirely across the southern entrance to the bay, effectively separating it from the Gulf of Mexico. Figure 2-4 pre-

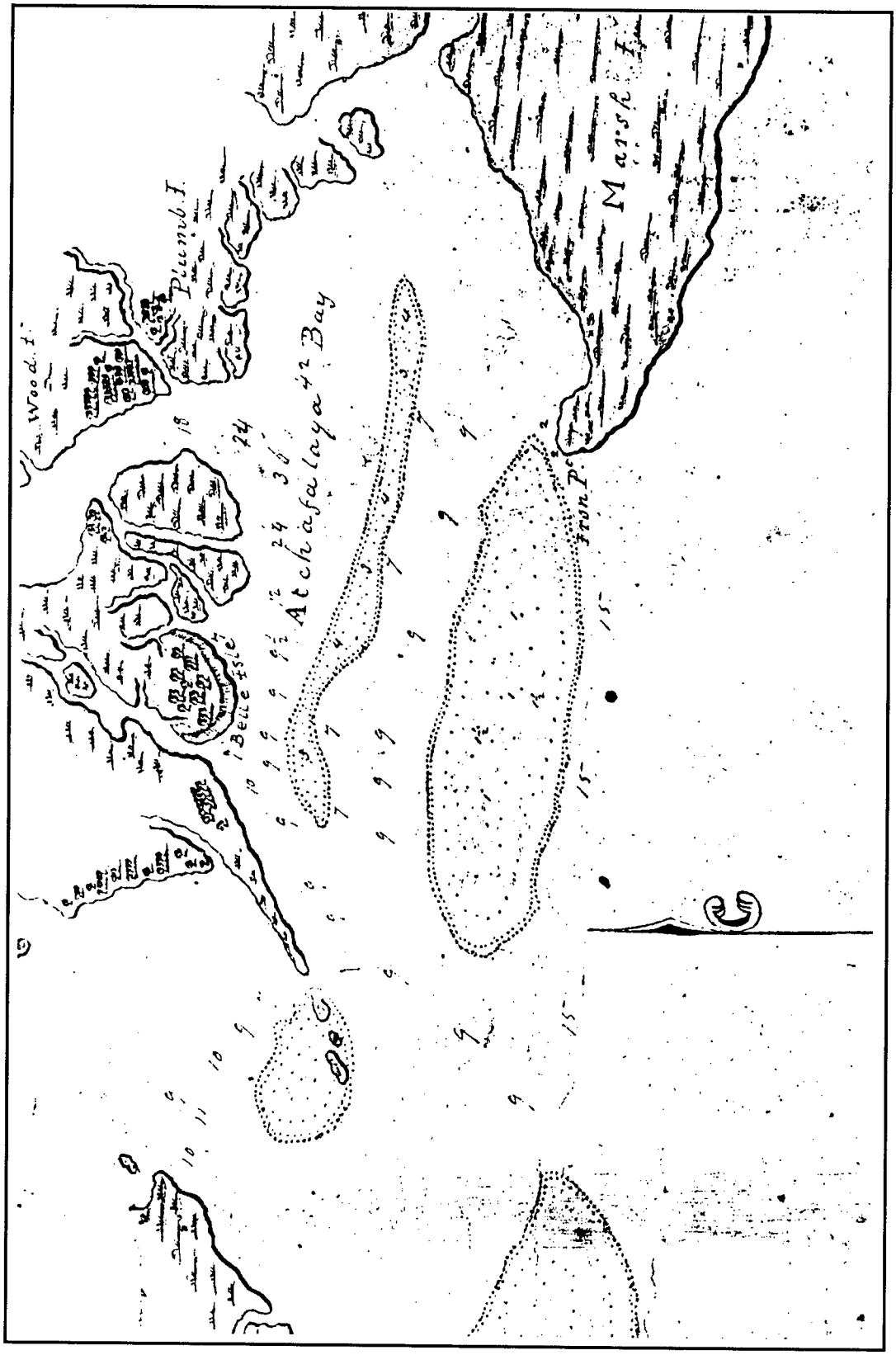


Figure 2-4. Detail of a circa 1830-1840 United States Topographic Bureau map showing navigation conditions in Atchafalaya Bay (United States Topographic Bureau n.d.).

sents a portion of an early nineteenth century United States Topographic Bureau map of the lower Atchafalaya River region that provides information on navigation conditions within Atchafalaya Bay (United States Topographic Bureau n.d.). The undated map is believed to date prior to 1840 and it depicts the shallow Point au Fer Shell Reef extending westward from Point au Fer ("Fron Pt." on the map). At that time, the navigation channel into the bay ran along the western end of this reef, then northeast to near Belle Isle and then eastward along the northern end of the bay to the entrance of the Atchafalaya River. Today, the top of the Point au Fer reef is generally equivalent to mean water level such that it works to inhibit current flow into and out of the bay and tends to break up waves moving north from the Gulf of Mexico (Seidel et al. 1998:5). Several tidal-scour channels, some as deep as 45 ft, cut through the reef, as does the modern shipping channel, the Atchafalaya River Bar Channel. In the past, the Point au Fer Shell Reef, as well as smaller shell reefs in Atchafalaya Bay presented hazards to vessels traveling into and out of the bay.

Sedimentation is an ongoing process in Atchafalaya Bay and on the Gulf bottom seaward of the Point au Fer Shell Reef. These sediments are derived from the silt-laden waters of the Atchafalaya River. Heinrich (n.d.:10) estimates that between 1890 and 1935, approximately 6.5 ft (2 m) of sediment were deposited in this area and another 2 ft (0.6 m) accumulated during the 16 years between 1935 and 1951. Sedimentation in the upper end of Atchafalaya Bay increased markedly in 1952, reportedly principally because of the completion of filling of many of the lakes within the Atchafalaya Basin (Seidel et al. 1998:6). This same year marked the emergence of a delta at the mouth of the Atchafalaya River. This delta has continued to grow as the outflow of the Atchafalaya River and the amount of sediment carried has increased. It is, also, presumed that sedimentation is continuing on the bottoms of the Gulf of Mexico south of the Point au Fer Shell Reef (Heinrich n.d.:12).

Geomorphic Processes and Shipwrecks in the Study Area

The present condition of any wreck within the study area is closely related to and dependent upon the natural forces and depositional processes which have occurred since sinking. Within the study area are a variety of natural systems each of which exhibits sets of processes that differentially impact a boat wreck. These processes include erosion, sedimentation and entrainment in active fluvial systems, erosion, current flow and sedimentation in coastal settings, and erosion, sedimentation and subsidence in marsh and swamp systems. An understanding of the nature and spatial distribution of these processes is critical in any effort to assess the probable conditions of any individual boat wreck or in developing generalizations about the probabilities of wreck preservation over a large area or within a particular natural system.

The natural processes occurring in the various natural systems within the study area have been extensively studied and there characteristics are reasonably well defined. However, they can be extremely complex and their impact and influence on the remains of sunken vessels have not been studied in great detail. The purpose of the following discussion is not to provide a detailed technical discussion of these processes, but to provide general descriptions that emphasize those points of critical concern to this study.

Fluvial Processes

The fluvial processes related to channel migration, sediment transport and sediment deposition are of particular interest here. Channel migration is a characteristic of almost all of the streams within the study area, although the extent of migration varies considerably dependent upon many factors, including stream discharge, sediment load, bank material characteristics and frequency and deviation of high flows. Lateral channel migration produces meanders which normally contain two important features; cutbanks and point bars. Point bars form on the inside of a meander and are the site of active sediment deposition. Cutbanks form on the outside or concave side of a meander and are the point of active erosion, often characterized by slumping and bank undercutting. The velocity of flow across a stream channel varies considerably, accounting for these two different processes. The line of maximum velocity of a stream follows a winding course which impinges on the cutbank side slightly downstream of the axis of the meander. This course of maximum velocity produces the thalweg or deepest section of the channel. The flow is rapid on the cutbank side and it also creates a downward acceleration, both of which contribute to erosion (Murphy and Saltus 1981:79). The flow is reduced on the inside of the bend and sediments are deposited, producing the point bar and eventu-

ally resulting in the typical accretionary topography of ridges and swales.

As cutbank erosion and point bar deposition occur, average channel width is maintained and, therefore, lateral migration occurs. Within the study area the rates of lateral migration vary considerably from stream to stream and along any one stream.

The impacts of cutbank erosion on wrecks must be considered generally destructive. Most vessels sunk at or on a cutbank, or impacted by cutbank erosion, would probably be removed and incorporated into the stream. (It is conceivable that the heaviest elements of a sunken vessel, such as the engines, might not be moved any great distance, dependent upon the velocity of the stream.) What then happens to the shipwreck or elements of the shipwreck is contingent upon a number of factors relating to both the nature of the wreck event and the character of the stream. These are discussed later.

The point bar of a meander is a locus of deposition and accretion. Unlike the situation on a cutbank, the processes producing a point bar can contribute to the preservation of shipwrecks. Figure 2-5 presents a diagrammatic cross section of a meandering channel depicting the physical processes which occur over time. A hypothetical shipwreck location has been plotted on this figure which demonstrates the manner in which a wreck can be incorporated into an accreting point bar. We assume that any given wreck will undergo natural deterioration and physical damage from stream flow as it becomes encapsulated, but there are currently no data which permit any reliable estimate of the specific nature and extent of these impacts. They are, certainly, extremely variable. One example which demonstrates how well shipwrecks can be preserved in fluvial accretionary settings are the sidewheel, ironclad gunboat USS *Eastport* and the sidewheel steamer *Ed. F. Dix*, which sank near the town of Montgomery, Louisiana, on the Red River in 1864 and 1865 respectively (Birchett and Pearson 1995). The *Eastport* sank and was subsequently blown up by Union forces retreating down the Red River, while the *Dix* struck the sunken remains of the *Eastport* a year later and sank. Both vessels now lie one on top of the other under about 10 m of fluvial sediment adjacent to the modern river course. Excavations conducted in 1995 revealed that the remains of both vessels are extremely well preserved, even though both wrecks were exposed to the main flow of the Red River for some period of time before the river shifted and deposited sediments on the two wrecks, completely burying them (Pearson and Birchett 1999). Although the Red River is more active and experiences much greater lateral migration than most of the streams in the study area, roughly analogous settings are found throughout the Atchafalaya Basin and the possibility that vessels have been preserved in this manner must be assumed.

Another aspect of channel migration is the production of oxbow or cutoff lakes when meanders develop to the point that the meander neck is cut through. Oxbow lakes are not common features within the present study area, but some do occur. Abandoned courses, where the river shifts and abandons a stretch of the former river course, fall into the same category as oxbow lakes. Abandoned, or partially abandoned, courses are more prevalent in the study area than are oxbow lakes. Since both types of features do occur within the study area, their relationship to wrecks as archeological sites needs consideration. In the case of oxbows, once stream flow abandons a section of the river an evolutionary process begins whereby the cutoff bendway is transformed from a river into a lake. For a varying period of time, flow and sediment will continue to enter the cutoff from the river during periods of high water. In the early stages of its existence infilling in a cutoff lake is fairly rapid. The rate of infilling slows once the batture channel(s) leading to the river are filled and blocked by sediment. Even when all river sediment is blocked, the cutoff bendway will continue to fill very slowly through the process of sediment input from erosion and runoff and accumulation of organic materials from rooted and floating aquatics (Wicker 1983:445). In the case of abandoned courses, the relict feature may never develop into a true lake, particularly if some decreased amount of flow continues to occur. However, with decreased or suspended water flow an abandoned course follows a similar pattern of infilling and, commonly, the accumulation of organic materials. Sometimes the old course will fill completely, at other times it becomes occupied by an underfit stream flowing within a much narrower and shallower channel than the original. Many of the bayous within the present study area represent abandoned or partially abandoned distributary courses, now occupied by underfit streams. Among these are Bayou Teche, Bayou du Large, Bayou Grand Caillou, Bayou Petit Caillou, and Bayou Terrebonne. A significant amount of infilling has occurred in all of these streams.

This phenomenon is of importance in this study, since vessels lost in cutoff lakes or abandoned courses

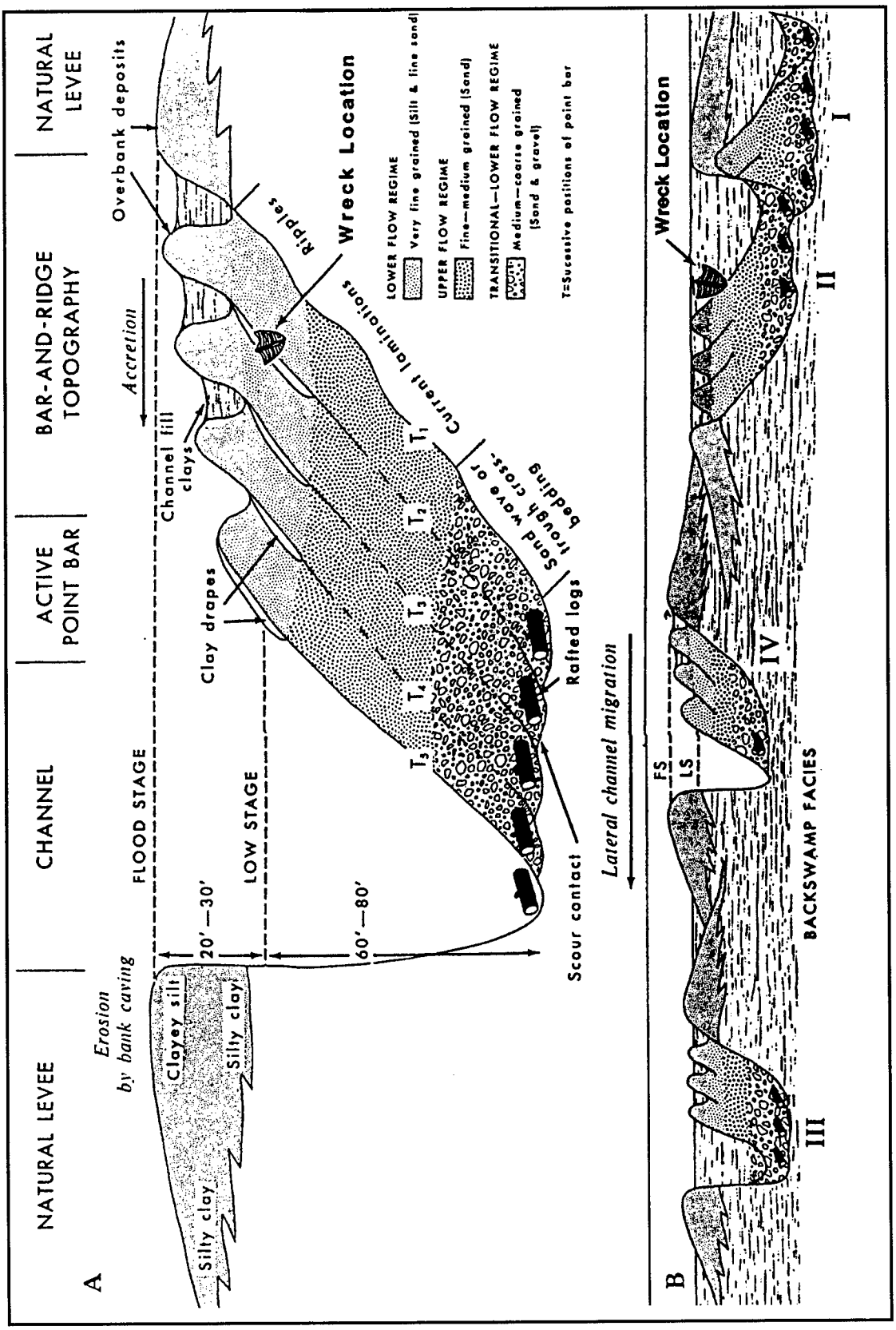


Figure 2-5. Diagrammatic cross-sections of a meandering channel and meander belt (lower) depicting positions where shipwrecks can be encapsulated in sediments and preserved (Gagliano and van Beek 1970:Figure 32).

have the potential to be covered by sediment and preserved. Those lost after the cutoff or abandoned course was initially formed, also, are removed from the physical impacts associated with stream flows and have an even greater chance of being preserved undamaged. However, the impacts that river flow have on sunken vessels are extremely complex and variable and, as noted above for the wrecks of the *Eastport* and the *Dix*, are not necessarily deleterious.

The impact, separate from those closely associated with channel migration, which a flowing stream has on a boat wreck is another factor which must be considered. The factors involved in this impact have been discussed in Pearson et al. (1989) and are reviewed here. Three fluvial processes are of relevance to shipwrecks in the study area: entrainment, transportation and deposition. These processes bear directly on the question of how much material originally deposited at a shipwreck site will remain.

Entrainment refers to the initiation of movement of a particle or object. Along with transport and deposition, it is related to both stream velocity and particle size. Very simply, in general, larger, heavier objects require greater velocity to initiate and sustain movement than do smaller, lighter objects.

Once an object is entrained it is transported in one of four ways: 1) as bed load; 2) through saltation; 3) in suspension; and 4) in solution (Murphy and Saltus 1981:72). Material carried in suspension or in solution are of little, if any, importance relative to the question of shipwrecks. They may, however, relate to the preservation of cargo items carried on vessels. Certain cargo items, such as flour, may be removed in suspension or solution. On the 1766 wreck of *El Nuevo Constante*, cargo items, such as cochineal, were rare or absent because they had dissolved and been dispersed (Pearson and Hoffman 1995). The other two processes of transport are of greater concern. Bed load refers to objects that are bumped or rolled along in the bed of a stream. Saltation refers to movement by which an object is moved downstream in a series of hops or jumps. Turbulent eddies or other factors producing significant differences in flow velocities are primarily responsible for saltation.

An object is deposited when stream velocity drops below the critical level needed to keep it in transport. As stream velocity slows larger objects are deposited first, followed by smaller materials. The flow characteristics, and thus velocity, of a stream vary considerably over space and time. As noted above, the spatial variability in velocities in meanders results in differential deposition erosion. Discharge, however, probably has the most significant effects on velocities for fluvial systems as a whole. During floods velocities are increased and thus larger and heavier objects can be entrained and transported. The opposite occurs during low-water stages. Within the study area, efforts have been made in recent years to confine the course of the Atchafalaya River to a single channel (United States Army Corps of Engineers 1982). This resulted in increased stream velocity, which certainly has compounded the potential for damage to any sunken wrecks directly impacted by the river flow.

Stream slope also effects velocity, the steeper the slope the greater the velocity. Within the study area, the slopes of streams are low, or very low, such that it does not contribute significantly to stream velocity and, thus, has minimal relevance to this study.

Velocity does, however, vary spatially along streams within the study area as has been discussed relative to channel meander activity. Localized fluctuations in velocity can also result from irregularities in the stream bed or obstruction in the channel. Obstructions can form low-velocity eddies on their downstream side resulting in increased sedimentation in this "velocity shadow" (Murphy and Saltus 1981:74). With an increase in stream velocity, just the opposite can happen, turbulent eddies will be produced and sediment will be removed.

Any individual wreck provides some finite number of objects that potentially can be entrained, transported and deposited downstream. The final deposition of an item depends upon its physical characteristics, how it was used, where it was attached to the vessel, and how the vessel sank. Small objects, those that float and those that are unattached, are going to be removed immediately, if there is even minimal stream velocity. On the Atchafalaya River velocities can be very high such that fairly large, heavy objects could be moved. In general, however, the majority of other streams in the study area have low mean velocities except during periods of flood. Boat wrecks, or large objects associated with wrecks, are less likely to be removed on these streams. It is obvious that the variability in stream velocities across the study area is going to result in differential impact on sunken vessels. On some streams, such as the Atchafalaya River, the high stream velocities

provide a mechanism which can seriously damage and disperse a wreck. On generally sluggish streams, flow is going to have less damaging impact on a wreck.

When an object is entrained and transported from a shipwreck, the question is where will it be deposited? This will vary greatly, but an obvious location will be a nearby, downstream point bar or pool or any similar locale where water velocities decrease.

Sediment Accretion in the Atchafalaya Basin

Sedimentation is the natural process which is of greatest relevance to this study of navigation history and boat wrecks as archeological sites. In very short periods of time, sedimentation has filled large areas of open water within the lower Atchafalaya Basin resulting in the elimination or relocation of navigation routes and, often, forcing changes in the locations of landings and ports. Thus, any effort to identify potential wreck locations has to consider the changes which have occurred in routes of travel by watercraft. Additionally, the rapid sedimentation has certainly buried many sunken vessels which, while removing them from view and easy discovery, is likely to have enhanced their preservation. Once a wreck or portions of a wreck is covered by sediment it is removed from the physical impacts of current flow and placed in a low-oxygen environment. This latter condition reduces bacterial deterioration of organic materials such as wood. Once covered by sediment, a wreck site may also be removed from alternating dry and wet conditions which tend to damage both organic and non-organic materials, particularly iron. In light of its importance to this study, a comprehensive discussion of sedimentation within the study area, particularly in the Atchafalaya Basin, is presented.

As noted, the increased sedimentation in the Atchafalaya Basin is rapidly converting the basin from a predominantly swamp and lake environment to an increasingly terrestrial one. Prior to about 1930, the zone of most rapid sedimentation and land formation was in the upper and middle basin, north of Grand Lake. However, since that time the portion of the lower basin between Grand Lake and Morgan City has undergone extensive changes, experiencing massive filling in a relatively short period of time. Progressively migrating downstream, the zone of sedimentation formed a substantial lacustrine delta in Grand Lake by 1930 (Fisk 1952), and, by 1951, approximately one half of Grand Lake had been filled and numerous islands had developed in Six Mile Lake. By 1975 an estimated 85 percent of the lake system in the lower basin had been filled, as shown in Figure 2-6. The extent of filling is apparent when comparing the size of Grand Lake through much of the nineteenth century, as shown in Figures 2-2 and 2-3, with the post-1900 changes shown in Figure 2-6. Smith et al. (1986:54) estimated that complete filling of Grand and Six Mile Lakes would occur by the year 2000, although this has not occurred.

To maintain the navigability of the Atchafalaya and to improve the discharge capability of the river, the Corps of Engineers began a dredging program in the basin in 1932. Between 1932 and 1940, a channel was dredged through the developing deltaic area in the middle and lower basin. Dredging was commenced in the upper basin in 1938, plus improvements were instituted in the area of the junction of the Red, Old, and Atchafalaya Rivers (United States Army Corps of Engineers 1982:A-16). In 1954, a program was begun to accelerate the "maturation" of the Atchafalaya River by expanding its cross-sectional area to 100,000 square feet. This program involved increasing confinement of flows to the main channel by closure of distributary streams, dredging of the main channel, and placement of dredged material along river banks (United States Army Corps of Engineers 1982:A-16). This program of work was discontinued in 1968; however, since that time the channel cross-section has increased at certain locations. However, below River Mile 100, which includes most of the areas examined in this study, little confinement had been achieved and the average channel area as of the late 1980s was only about 38,000 square feet (United States Army Corps of Engineers 1982:A-16, Table A-4-7).

Examples of these rapid physiographic changes are provided in a cultural resources study undertaken by Coastal Environments at several locations along the Atchafalaya Basin Main Channel (Pearson and Saltus 1991). This study, which involved remote-sensing survey and diving in the search for underwater cultural resources, also examined the physiographic changes which had occurred at the several project locations. Figure 2-7 presents a sequence of bankline locations since 1838 and information on infilling for the area in the vicinity of Cypress Island and American Pass above Morgan City developed in Pearson and Saltus (1991:21). In the nineteenth century, the area examined by Pearson and Saltus (the "study area" in Figure 2-7) fell within Grand Lake, at that time the largest lake in the ba-

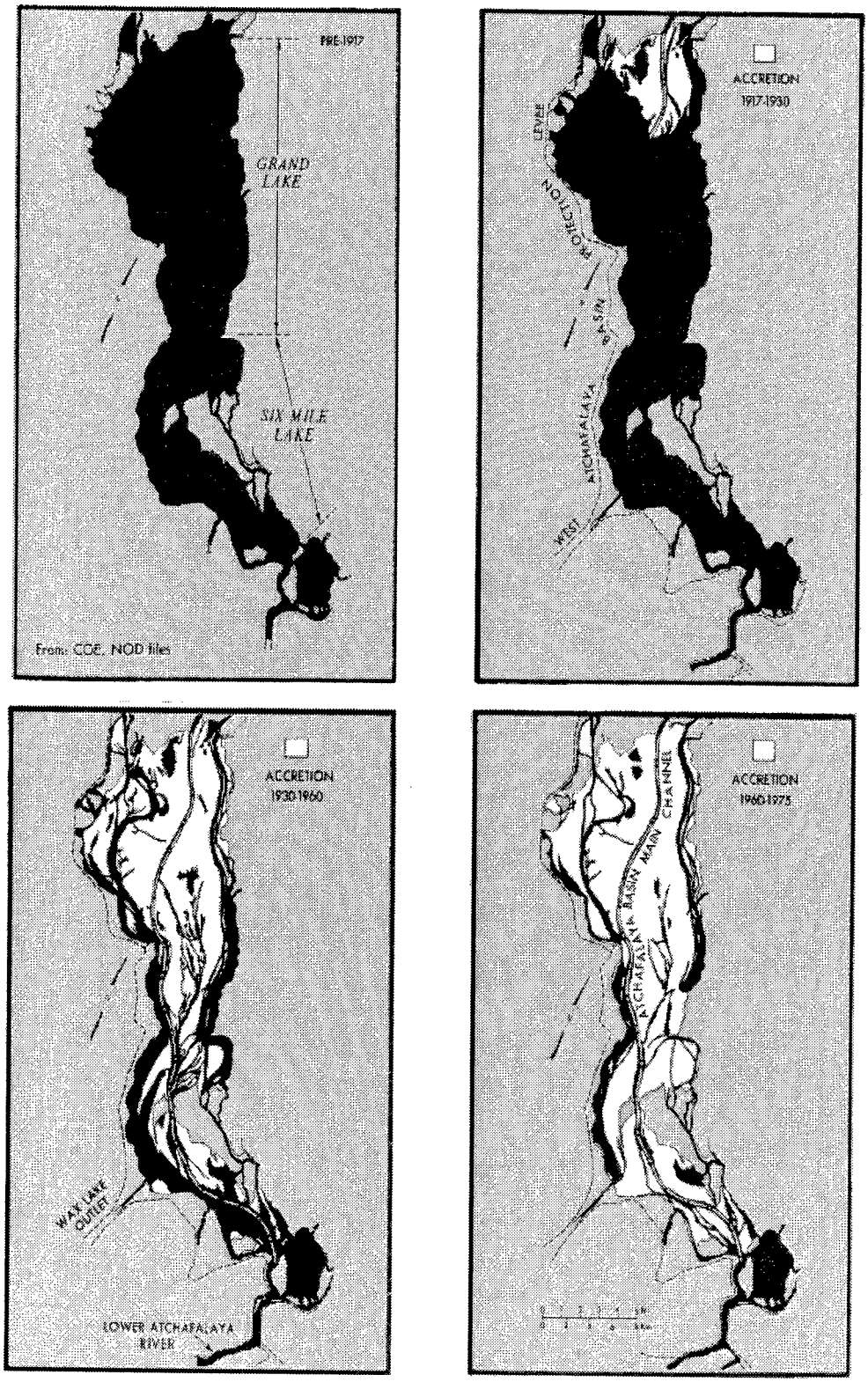


Figure 2-6. Sequence of filling of Grand and Six Mile lakes (Adams and Baumann 1980:Fig. 6).

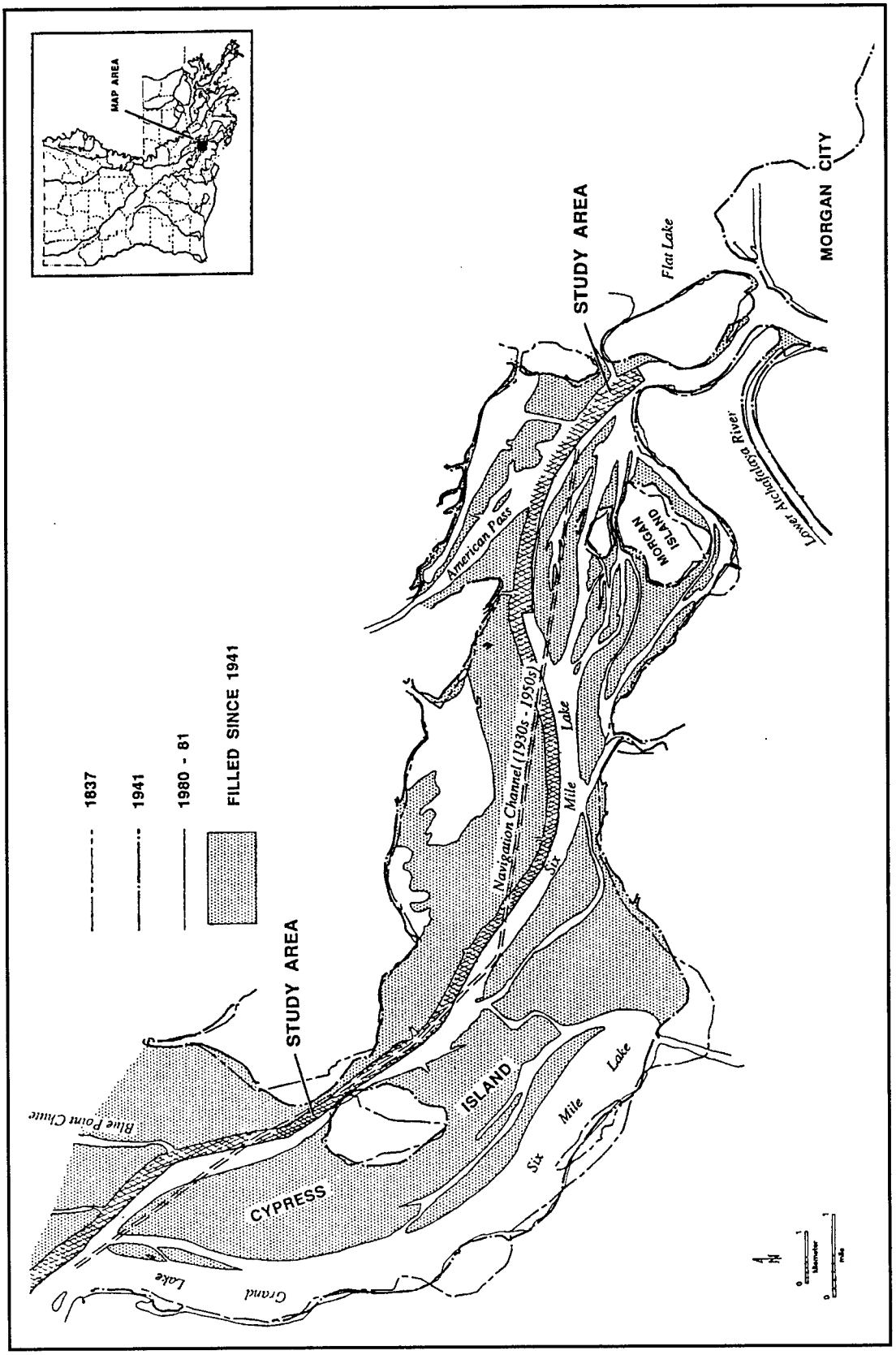


Figure 2-7. Physiographic changes in the Atchafalaya Basin above Morgan City (Pearson and Saltus 1991:Figure 5).

sin. The distinction of the lower part of Grand Lake as Six Mile Lake seems to have occurred during the early years of this century, probably as Grand Lake began to fill. There is no specific hydrographic information from Grand Lake for the early period; however, in general, it was relatively shallow. John Landreth, who was involved in a survey of timber resources along the lower Atchafalaya Basin area for the United States government in 1818 and 1819, provides some useful information on the character of the region at that time (Newton 1985). During his travels across Grand Lake, Landreth commonly noted water depths. Generally, he indicated that the lake was on the order of 6 to 10 ft (2 to 3.5 m) deep and his deepest measurement, made near the middle of Grand Lake, was 21 ft (7 m) (Newton 1985:31).

In January of 1819, John Landreth surveyed what he called the "Chetimaches or Seven Islands," one of which he named "Island No. 5" (Newton 1985:44-52). Now known as American Island (located just east of American Pass in Figure 2-7), Landreth indicated that Island No. 5 contained 2375 acres and a "considerable quantity of Live Oak of a small class . . . ." (Newton 1985:46). He also reported that Island No. 5 was surrounded by "fine navigable Bayous open to the Lake," suggesting the possibility of navigation in the channels around American Island. In his journal, Landreth refers to American Pass as "Bayou Alligator" (Newton 1985:45).

Since the early years of this century, and particularly since the early 1940s, significant sedimentation and filling has occurred in this area, as shown in Figure 2-7, largely filling the "fine navigable Bayous" found by John Landreth. For most of its length, the study area examined by Pearson and Saltus falls within what had once been portions of shallow lakes. It is only in the area of Cypress Island Pass (located on the east side of Cypress Island) and just above American Pass that the area examined lies near landforms that are older than 50 years in age. Also shown in Figure 2-7 is the route of the navigation channel used in the period of the 1930s through 1950s (Fisk 1952). As can be seen, much of the area of this former navigation channel has since been infilled and incorporated into made land. The present navigation channel, the Atchafalaya Main Channel, follows the major course of the river in this area. This is a maintained channel whose existence is related as much to human activities as to natural processes.

Further information on the dramatic changes occurring in the morphology of the lower Atchafalaya River above Morgan City can be found in a series of cross-sections provided in Latimer and Schweizer (1951). Two cross-sections falling in the area above Morgan City are shown in Figure 2-8. These sections show that significant amounts of sedimentation have occurred in the vicinity of the main channel since 1917. Even more dramatic, however, is the clear demonstration that the modern channel (i.e., 1974 channel) is deeper than it was prior to dredging in the 1960s. This dredging, plus the other projects undertaken to confine the flow to the main channel, have acted to maintain, as well as create, a deep channel. For example, near River Mile 102, the 1974 channel was almost 30 ft (10 m) deeper than it had been prior to 1934 (see Figure 2-8).

This assessment of the physiographic and geomorphic histories of the area above Morgan City by Pearson and Saltus (1991) is important because it has direct bearing on the navigation history and the shipwreck potential of the this specific locale and, also, has general application to much of the study area under consideration here. The available evidence indicates that the areas examined by Pearson and Saltus only partially correspond to historic navigation routes, even though the areas examined by them fall entirely within the principal modern route of navigation, the Atchafalaya Main Channel (i.e., the Atchafalaya River). Information on nineteenth-century navigation does indicate that a principal water route across Grand Lake passed through Cypress Island Pass and Stouts Pass and that American Bayou and American Pass (or Grand Pass as it is sometimes called) were traveled by, at least, small boats. Since a relatively early period, at least since John Landreth's 1819 survey, American Pass has served as a water route to Bayous Sorrel and Boutte and on into the interior of the Atchafalaya Basin. American Pass has apparently never been a major route for commerce and the vessels using this stream probably consisted mainly of pirogues, batteaus, and, possibly, small luggers, and more recently a variety of small motorized boats (Abbot 1863a, 1863b; Pearson et al. 1989; Pearson and Saltus 1989:14). Presumably, the wreck potentials of the areas examined by Pearson and Saltus are high only where they correspond to former navigation routes and/or where they include or are adjacent to older landforms where landings, docks, or other watercraft-related activities may have been concentrated.

Further, as graphically demonstrated in Figure 2-8, the present maintained navigation channel in this area (the Atchafalaya Main Channel) is much

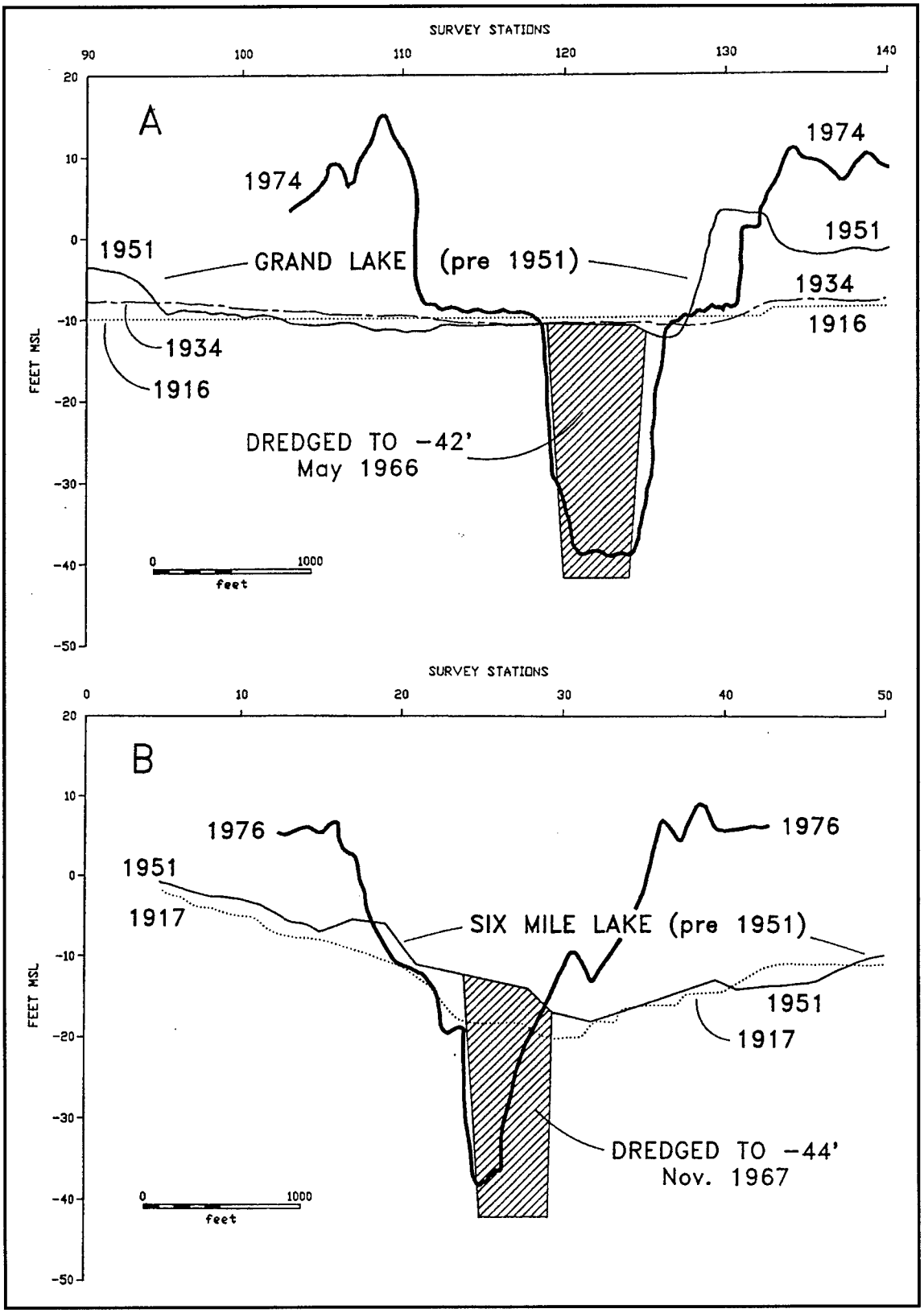


Figure 2-8. Cross sections taken across the Atchafalaya Main Channel above Morgan City in the area of Grand and Six Mile lakes. A. Near River Mile 102; B. near River Mile 108 (Latimer and Schweizer 1951).

deeper than it was prior to the 1950s. Thus, there is a possibility that vessels lost within the bounds of the present channel have been disturbed or removed by dredging or by the significant increase in the channel's flow.

As another example of physiographic changes in the study area, Figure 2-9 provides information on bankline changes and infilling provided by Pearson and Saltus (1991:Figure 7) for areas they examined below Morgan City. Modern (1980) and 1935 bankline information are shown. Bankline data from the plat maps of the 1830s were examined, but numerous inaccuracies in these maps made it impossible to accurately correlate them with more modern information. Sedimentation rates below Morgan City are considerably lower than in the basin proper above the city. As can be seen in Figure 2-9, channel changes along Bayou Shaffer have been slight in this century, and other map data indicate that the present course of the bayou closely follows the nineteenth-century course. The course of the Atchafalaya River below Morgan City, also, has been relatively stable such that the three areas examined by Pearson and Saltus fall primarily within the nineteenth century course.

Particularly important to the present study is that Pearson and Saltus discovered several wooden watercraft buried along the bankline of Bayou Shaffer. All of these boats are thought to have been purposefully abandoned. The oldest of these vessels, a sailing lugger and a coal barge, are believed to have been abandoned in the late nineteenth or early twentieth century (Pearson and Saltus 1991:88). These boats were buried by up to 3 ft (1 m) of sediment, all deposited within the past 100 years or so. Additionally, these two watercraft, plus others found buried and submerged along Bayou Shaffer, were extremely well preserved, certainly a factor of their relatively rapid burial after abandonment. Natural conditions identical to those found along Bayou Shaffer exist throughout the study area and we must assume that many other historic vessels have been similarly well preserved.

These two examples provided by Pearson and Saltus serve to illustrate the types of rapid physiographic changes that have occurred in parts of the study area in recent times. Importantly, these examples demonstrate the need for a careful consideration of the geologic history of specific locales in any effort involving the search for cultural resources of any type within much of the study area.

Farther north in the Atchafalaya Basin, in the vicinity of Whiskey Bay, noticeable sedimentation began sometime during the first decade of the twentieth century. Elliott (1932) reports no increase in average bank elevation in the central portions of the basin during the period 1880-1881 to 1904-1905. But from 1904-1905 to 1916-1917, the average bank elevation increased by 1.6 ft (0.5 m) and between 1916-1917 to 1931 it dramatically increased by 4.8 ft (1.46 m). Thus, in a 27-year period the banks were buried by approximately 6.4 ft (2 m) of sediment. Since flood waters were not confined just to the levees, it can be assumed that the swamps were likewise covered by sediment, but to a lesser degree.

Beginning in 1932, the U.S. Army Corps of Engineers started surveying transects across the Atchafalaya Basin to measure changes in ground surface elevations. Several of these transects are presented as Figures 2-10 through 2-16 to provide additional information on the varying amounts of sedimentation that has taken place in the central and lower portions of the basin. Figure 2-11 presents one of these transects (Range Line 6) in the Whiskey Bay Pilot Channel area of the central basin showing the amount of fill that occurred between 1932 and 1963. It should be noted that these cross sections do not include the more recent effects of the great floods of 1973-74 and the high water of the early 1980s. Both of these events probably added significantly to the overburden that buried the area. In the triangle of land between the Whiskey Bay Pilot Channel and the Atchafalaya River, fill ranges from a maximum of 19 ft (6 m) to a minimum 6 ft (1.8 m) in thickness. On the point bar of the right descending bank of the Atchafalaya River, only a thin veneer of sediment masks the 1932 surface. However, Elliott's report (1932) suggests that this stretch of the river may be under a much greater thickness of very recent material.

Range Line 11 (see Figure 2-12), Range Line 12 (see Figure 2-13), and Range Line 13 (see Figure 2-14) provide similar evidence of rapid sedimentation. Between 1932 and 1967 overflow sediment and spoil deposition ranged from a maximum of 39 ft (12 m) to a minimum of 6.5 ft (2 m) deep. Greatest thicknesses are found adjacent to the channels where natural levees normally occur. But even in the backswamps, the accumulation of a significant amount of material has raised the surface elevations.

Corps of Engineers' Range Line 14 (see Figure 2-15) and Range Line 15 (see Figure 2-16) provide

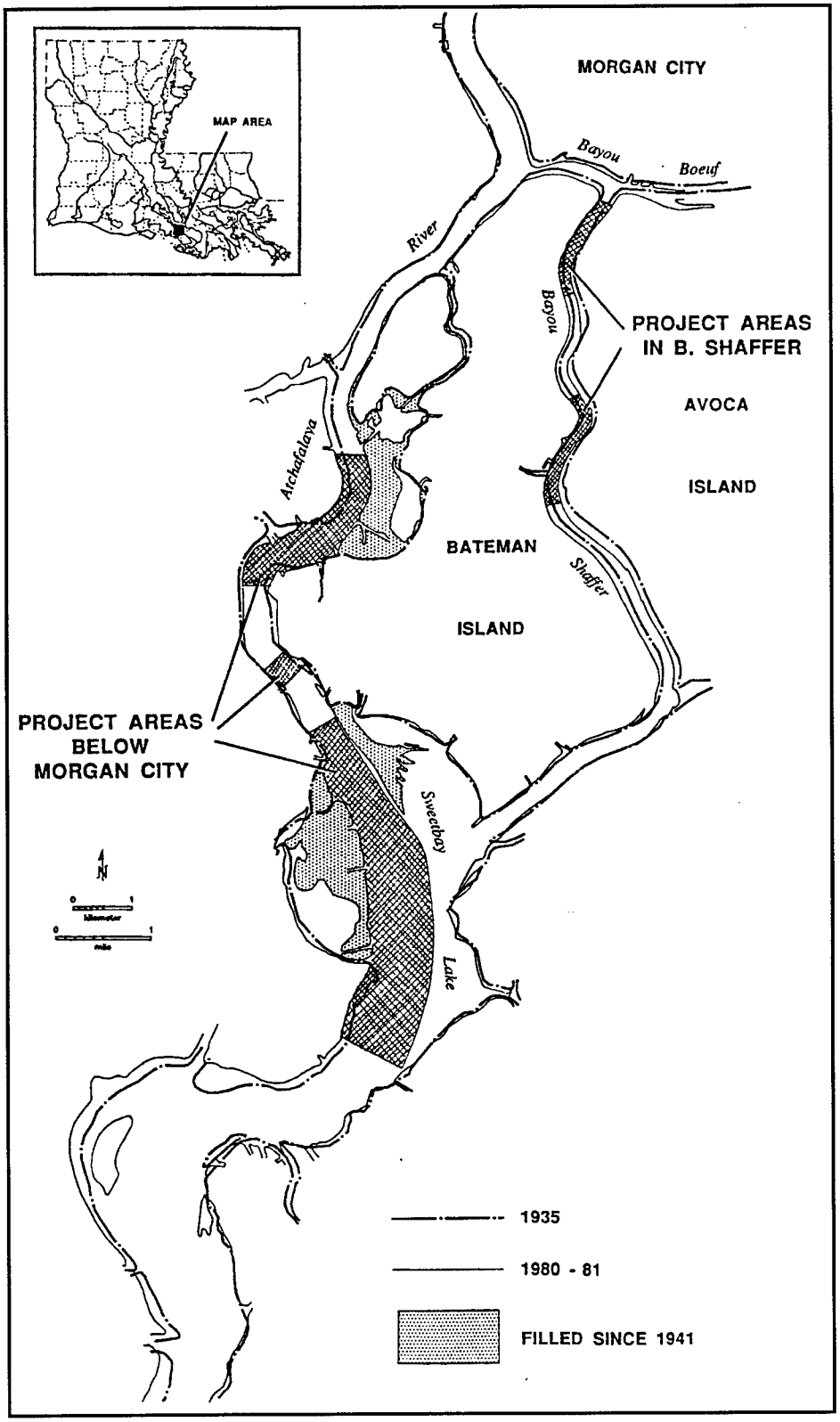


Figure 2-9. Physiographic changes along the Atchafalaya River below Morgan City (Pearson and Saltus 1991:Figure 7).

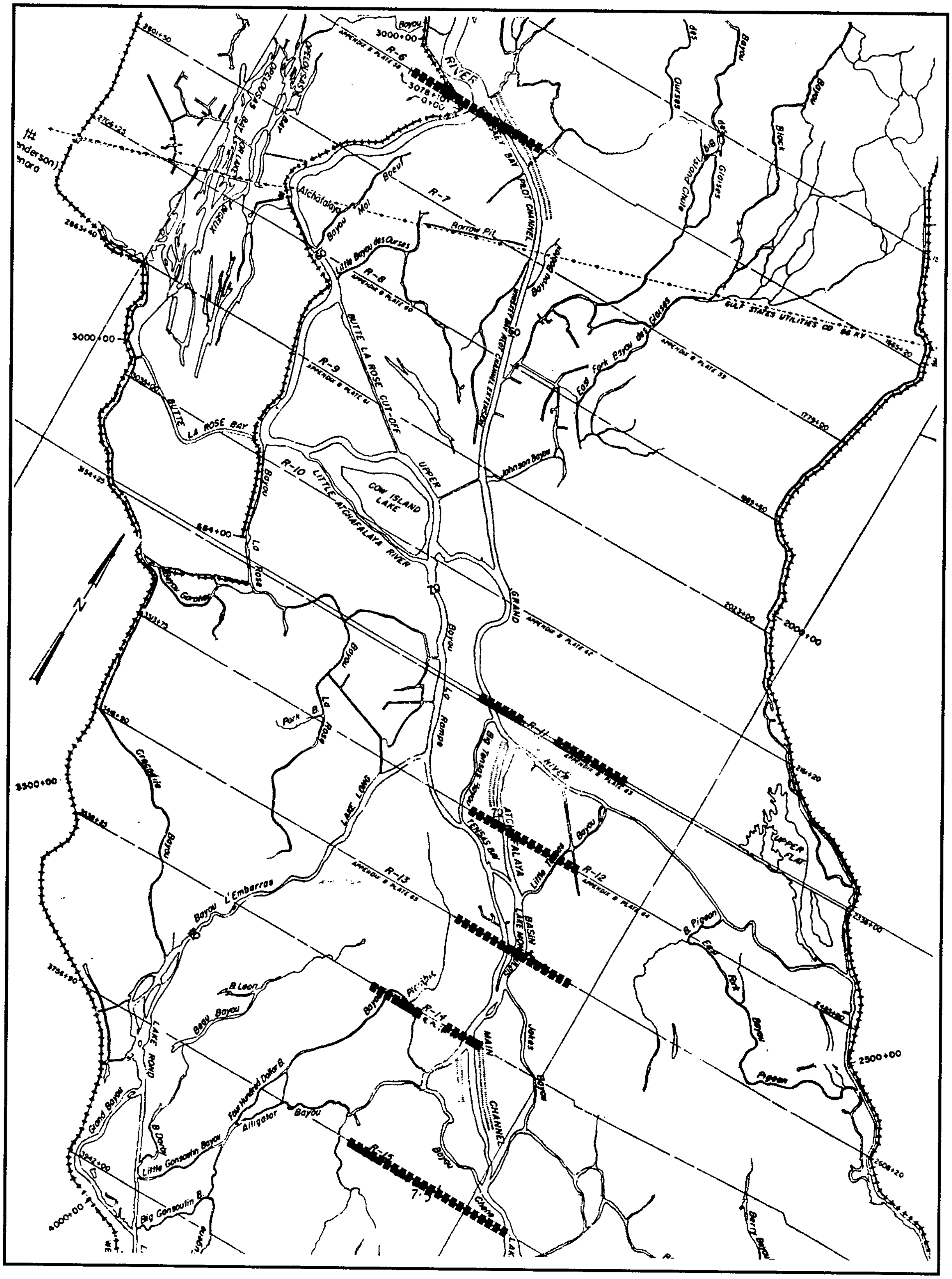


Figure 2-10. Map showing the locations of U.S. Army Corps of Engineers survey transects in the Atchafalaya Basin (United States Army Corps of Engineers 1974:Plate 209).

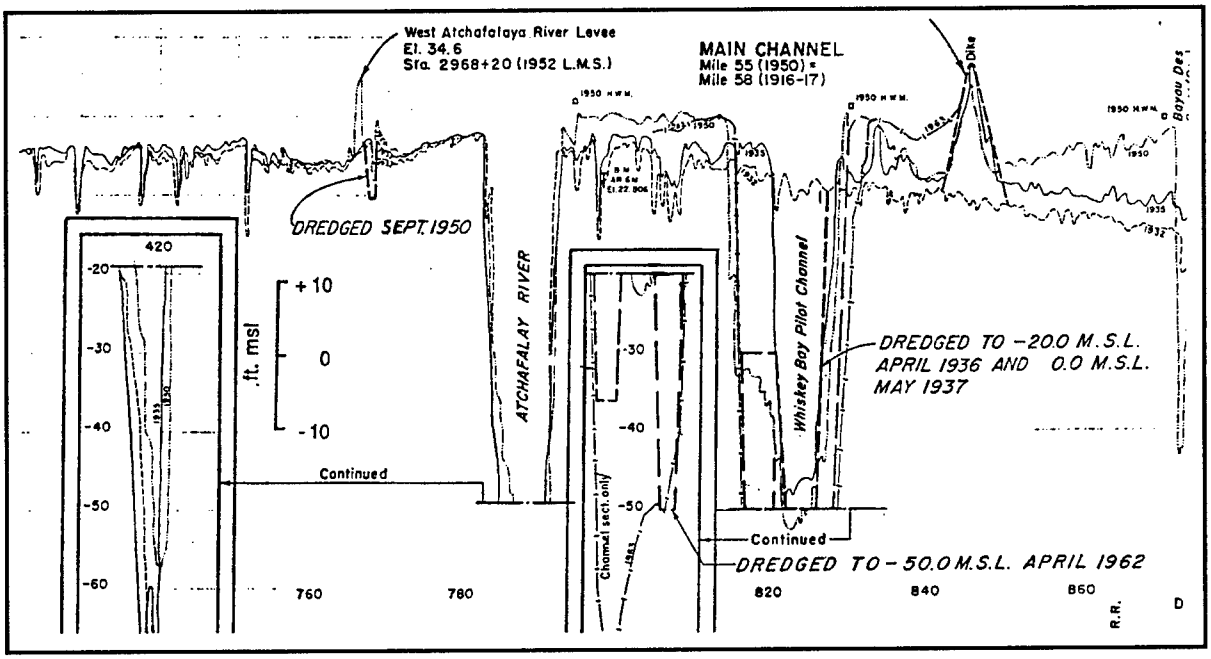


Figure 2-11. Cross-sections taken along a portion of transect R-6 showing the amount of sedimentation that has occurred within the central portion of the Atchafalaya Basin in the upper end of the study area. See Figure 2-10 for location (United States Army Corps of Engineers 1974:Plate 213).

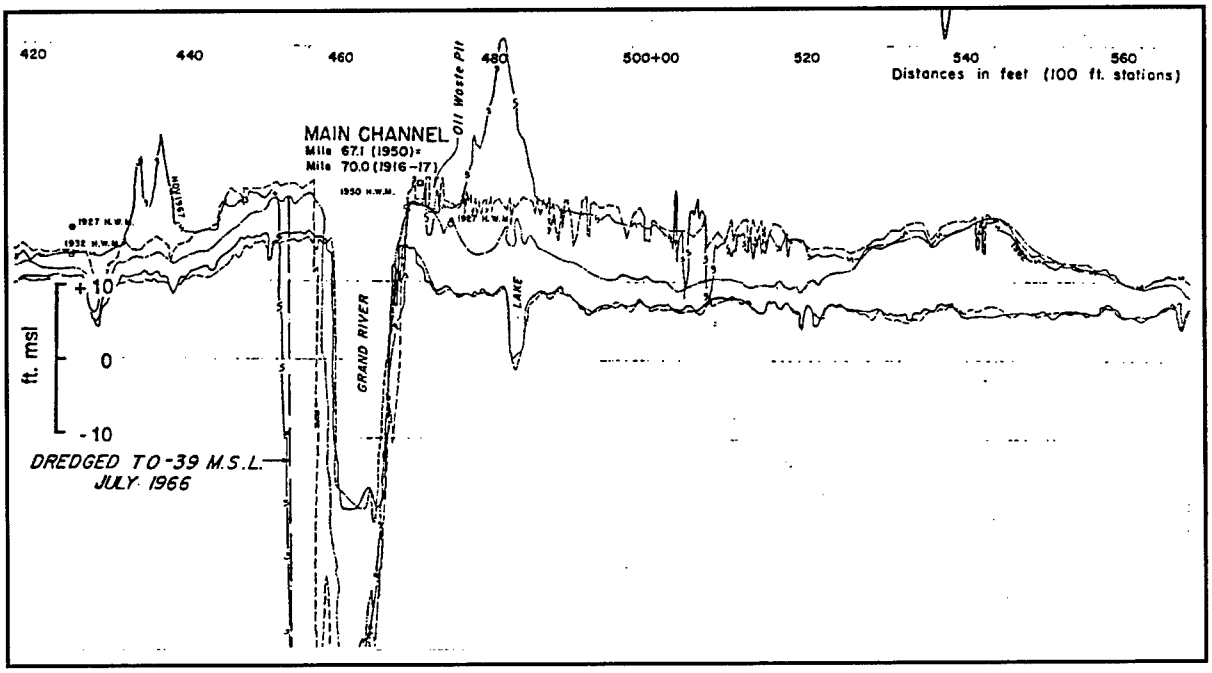


Figure 2-12. Cross-sections taken along transect R-11 showing the amount of sedimentation that has occurred in the upper portion of the study area. See Figure 2-10 for location (United States Army Corps of Engineers 1974:Plate 220).

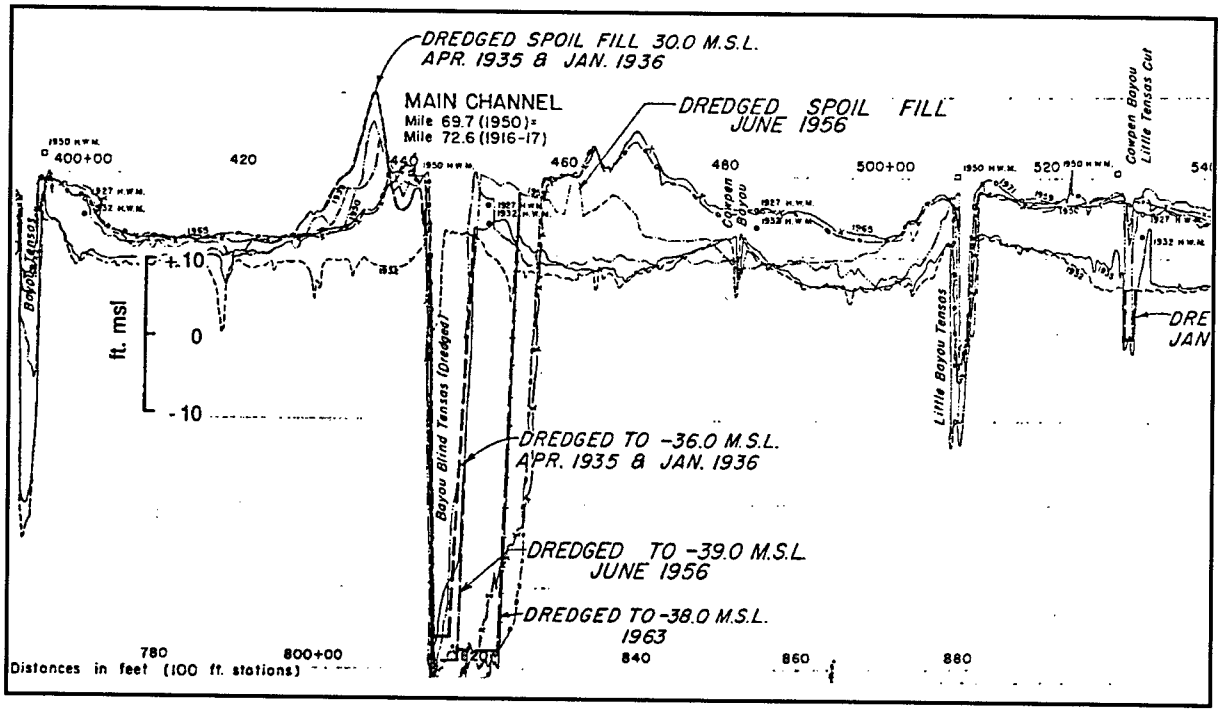


Figure 2-13. Cross-sections taken along transect R-12 showing the amount of sedimentation that has occurred in the upper portion of the study area. See Figure 2-10 for location (United States Army Corps of Engineers 1974:Plate 221).

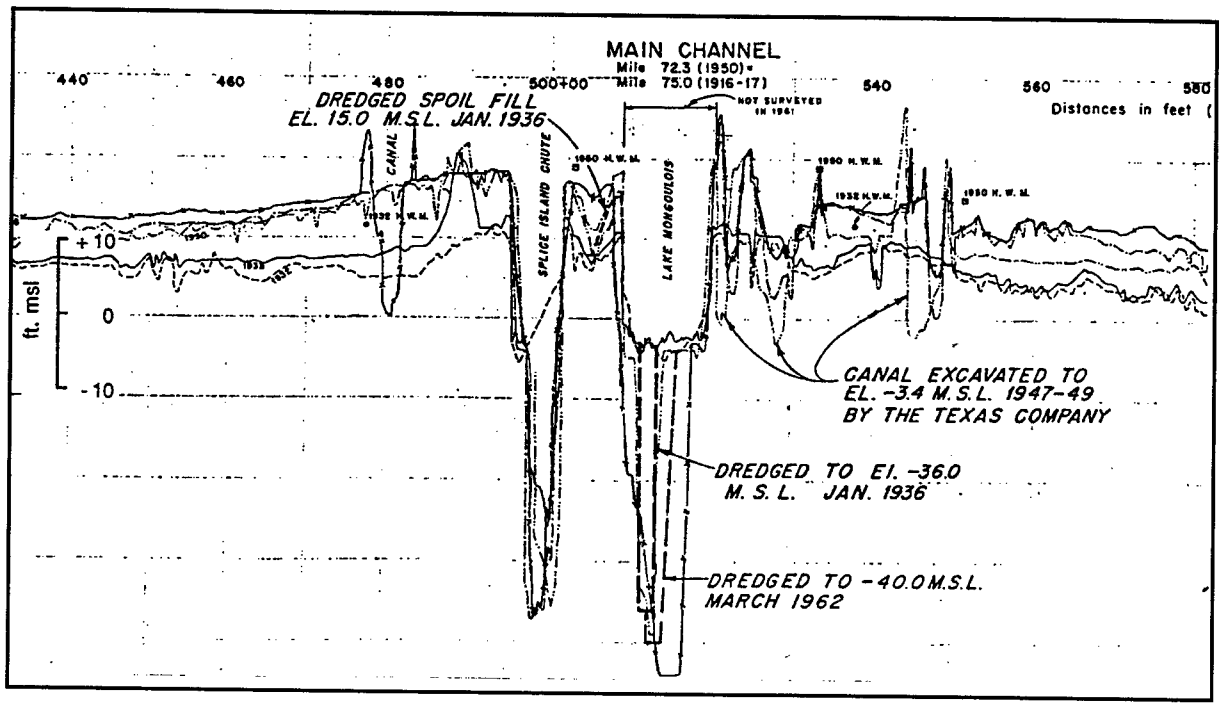


Figure 2-14. Cross-sections taken along transect R-13 showing the amount of sedimentation that has occurred in the central portion of the study area. See Figure 2-10 for location (United States Corps of Engineers 1974:Plate 222).

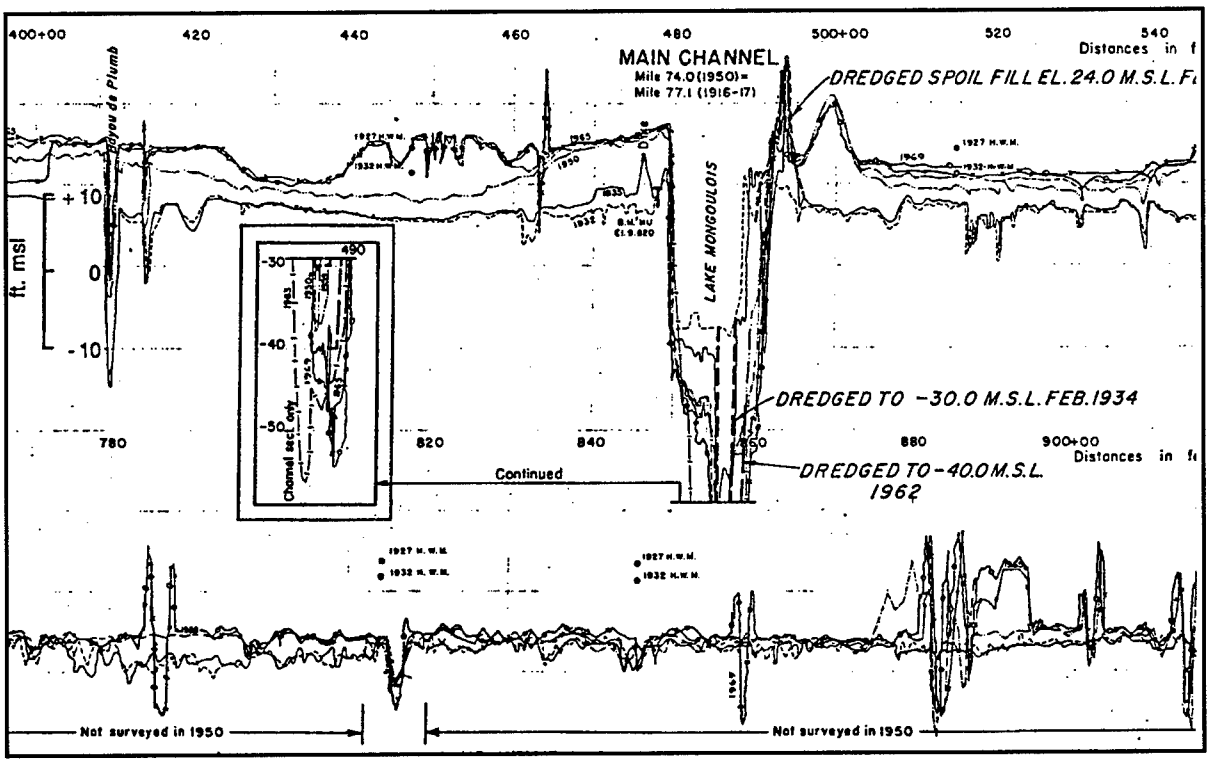


Figure 2-15. Cross-sections taken along transect R-14 showing the amount of sedimentation that has occurred in the vicinity of Bayou Chene in the central portion of the study area. See Figure 2-10 for location (United States Army Corps of Engineers 1974:Plate 223).

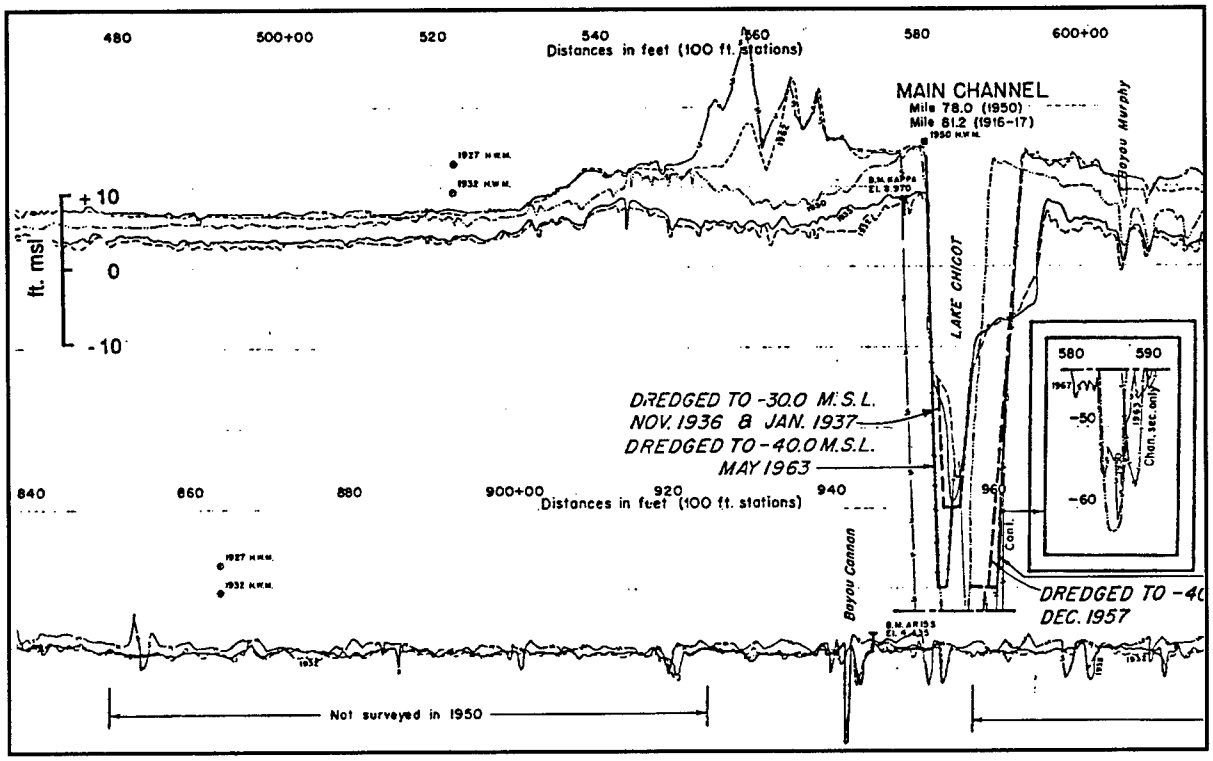


Figure 2-16. Cross-sections taken along transect R-15 showing the amount of sedimentation that has occurred in the vicinity of Bayou Chene in the central portion of the study area. See Figure 2-10 for location (United States Army Corps of Engineers 1974:Plate 224).

information on the Bayou Chene region in the upper part of the study area. Analysis of these two cross sections again shows up to 7.6 m of recent deposition (accumulated between 1932 and 1967) near the channels, and a decrease in elevation and thickness into the basins where only 6 ft (1.8 m) of overburden is found.

Another piece of evidence that attests to the increased sediment deposition in recent years in the Bayou Chene area is found in local cemeteries. King (1977) reports that displaced residents from Bayou Chene frequently took their children to visit the family graves at Bayou Chene. However, this practice has ceased at most cemeteries because the graves are silted over. An inspection of two Bayou Chene cemeteries in March 1989 revealed that headstones of most graves were buried beneath recent sediment. The only headstones visible were three in the Diamond family cemetery, where family members have periodically raised headstones after each new depositional episode (Castille et al. 1990).

Several conclusions can be drawn from an assessment of the available geologic and cultural data. First, in large part as a result of man's modification of the hydrologic system within the Atchafalaya Basin, significant sedimentation has taken place across the floodplain. Few areas remained unaffected by the massive influx of sediment as the Atchafalaya enlarged and captured more and more of the Mississippi River flow. Second, maximum thicknesses of sediment are adjacent to the channels because of natural depositional processes, plus the practice of placing dredged material from navigation channels as close as possible to the dredge location. Third, the cross sections presented here do not include any siltation from the catastrophic floods of 1973-74 or the lesser floods in the early 1980s; additional layers of material are to be expected. Finally, it is apparent that considerable thicknesses of sediment cover cultural features that were exposed just a few years ago. Older features, particularly those dating to the prehistoric and early historic periods, are likely to be deeply buried.

As discussed earlier, sedimentation rates also are rapid at the mouth of the Atchafalaya River, where active delta building is now occurring, and in Atchafalaya Bay and the area immediately offshore. The delta may have covered vessel remains as it formed, plus the sediments derived from the outflow of the Atchafalaya River might have buried vessel remains in the bay and nearshore areas of the Gulf of Mexico. Off the entire southwestern Louisiana coast there is a band of muddy sediments derived from the outflow of the Atchafalaya River and the Mississippi River being deposited and distributed by the generally westward current along this section of the coast. At least in one recorded instance these sediments have contributed to the preservation of a shipwreck. The wreck of *El Nuevo Constante,* sunk in 1766, is located about 1.25 mi (2 km) off of Cameron Parish, Louisiana in about 19 ft (6 m) of water (Pearson and Hoffman 1995). The wreck site, when discovered, was covered by about 3 to 4 ft (1 to 1.5 m) of loose to compact mud which produced a low-oxygen environment at the site, leading to the preservation of many organic items, including the entire lower 3 to 4 ft of the vessel's hull (Pearson and Hoffman 1995). The upper works of the vessel have been removed and dispersed; however, the lowermost portion of the ship, as well as heavier items (e.g., cannons, iron fittings, ballast), remained in place despite the wreck's location in the moderately high-energy environment of the nearshore zone. The *El Nuevo Constante* site provides evidence of the type of excellent preservation of shipwrecks which can occur in the 3-mi-wide offshore segment of the study area, particularly off of Atchafalaya Bay where sedimentation has been extensive.

Sedimentation is, of course, an extremely variable process across both time and space in the study area. While in some areas, such as the lower Atchafalaya Basin, sedimentation is generally widespread, erosion and sediment removal is occurring along individual streams. It is not possible to argue that sedimentation is a consistent agent for preservation over the entire study area nor to postulate that all sunken vessels will be preserved in areas where sedimentation rates have been high. It is, however, reasonable to state that across a considerable portion of the study area sedimentation is a natural process which, for the most part, enhances the preservation of wrecks.

Subsidence and Erosion

Subsidence is another natural process which can contribute to the preservation of shipwrecks. In much of the coastal areas of Louisiana, including within the study area, subsidence is occurring; in some areas at relatively rapid rates. Long-term evidence of subsidence is apparent in the many subsided and now buried prehistoric archeological sites known from coastal areas of Louisiana. In Lafourche Parish, between Bayou Lafourche and Lake Salvador, ar-

cheological sites and the natural levees on which they rest have subsided as much as 2 m within the past 800 or so years (Pearson and Davis 1995:261). Subsidence may be of greatest concern in terms of prehistoric sites, but in some coastal areas the rates are so high that they are of concern even when dealing with wrecks and other sites of the historic period. For example, Roberts et al. (1994) in a study of subsidence in the marshes just southeast of Houma recorded average subsidence rates of Holocene deposits as high as 42.9 cm/100 years. This means that in the period from 1718 to the present, some marshland areas have subsided by as much as 110 cm (3.6 ft); indicating that boats lost or abandoned in these marshes could now be completely submerged or buried. Subsidence, because it results in the burial of an object, produces in a low oxygen and protected environment conducive to the preservation of a variety of materials. Prehistoric wooden or organic objects such as bowls, basketry, pieces of canoes, cordage, possible fish traps, etc., have been reported from subsided sites in Louisiana. Subsidence has undoubtedly contributed to the preservation of many prehistoric boats and it may play a role in the preservation of historic watercraft.

Presently, as in the past, the process of erosion continues to impact upon wrecks within the study area. Localized erosion and its impact in meandering streams has been discussed. Additionally, localized as well as widespread erosion and land loss is occurring throughout the coastal portions of the study area. Specific information is available for what is known as the Terrebonne Marsh Area, that portion of the study area east of the Atchafalaya River and south of the Gulf Intracoastal Waterway. This information comes from a recent habitat modeling project sponsored by the New Orleans District COE and conducted by the Center for Wetland Resources at Louisiana State University (discussed in Weinstein and Kelley 1992). This model, called the Coastal Ecological Landscape Spatial Simulation (CELSS), is a predictive model of landscape change that relied on previously prepared habitat maps, dating from 1956, 1978 and 1983. By comparing the changes seen in these maps and inputting additional variables such as sea level rise, salinity changes, Atchafalaya River discharge, nutrients, suspended sediment load, water flow, etc., it was possible to develop predictive statements about landform change, most particularly land loss, dependent upon the variables entered into the model. This study was conducted specifically to gauge future impacts that may result from the extension of the COE Avoca Island Levee. Critical to the present project, is that the model predicted that a considerable portion of the Terrebonne Marsh will have disappeared and been converted to open water by the year 2033. We must assume that boats now resting on or buried within these marshes, or sunk in shallow water bodies in the area, are likely to be impacted by this erosion.

Erosion is a process which is essentially detrimental to shipwrecks. It can remove a wreck site from its low-oxygen environment and expose it to destructive forces such as wave action and stream currents.

Biological and Chemical Impacts

The biological impact on shipwreck remains also has to be considered. It is extremely variable, dependent upon a variety of site-specific conditions and the consideration that biological impact will differ among the various materials at the site. Organic items, for instance, will be affected quite differently from metals, glass, and ceramics. In general, organic materials are buffered from biodeterioration while they are in the water. The conditions under which organic material tend to be preserved under water are: low temperature, anoxic soils (oxygen depleted such as when covered by fine grained sediments), low light (in deep water or buried), and minimal mechanical disturbances (natural disturbance, e.g., waves, or man-induced disturbances, e.g. dredging). A change in any of these conditions, whether it be from archeological excavation which removes sediment from a wreck or an object from the water, or from mechanical impact to the site, encourages chemical deterioration through oxidation and hydrolysis and invites deterioration of organics from fungi and boring mollusks.

One of the biological agents which can damage shipwrecks are shipworms (Teredinidae), mollusks which bore into and damage wood. Most shipworms live in normal ocean waters; however, some types can survive in brackish waters. Within the study area, shipworms are found in brackish and ocean waters, where they can cause serious damage to submerged wood. Shipworms, as filter feeders, do require open water, such that if a sunken wooden vessel becomes covered by sediment, it is removed from the full impact of shipworm damage. Within the study area, shipworm damage will be confined to brackish and marine environments, and its impact will be diminished in areas where wrecks are rapidly covered by sediments and remain so covered.

Bacteria and fungi also damage organic material, both in fresh and saltwater. Throughout the study area, conditions that are conducive to damage by these agents exist. For organic materials, damage from bacteria and fungi will be lessened under the conditions mentioned above. Iron, normally the most common metal in archeological sites is also affected by bacteria and chemical processes. The corrosion of iron in sea water occurs more rapidly than in fresh water because of the increased salt content of seawater. The details of iron corrosion in water are extremely complex and will not be detailed here. In general, however, "hydrated iron chlorides, on exposure to moisture and oxygen, hydrolyze to form ferric oxide or ferric hydroxide. The hydrochloric acid in turn oxidizes the noncorroded metal to ferrous chloride and hydrogen, or ferric chloride and water. This corrosion cycle continues until there is no metal remaining" (Hamilton 1983:164). Even when iron becomes covered by an encrustation of corrosion by-products or sediments, corrosion continues because of the presence of sulfate-reducing bacteria. Hamilton (1976:11) notes that as much as 60 percent of the corrosion of iron in saltwater is due to these bacteria and that they also contribute to a lesser extent to corrosion of iron in freshwater. Sulfate-reducing bacteria will be found in most salt and freshwater environments of the study area and will contribute to the corrosion of iron.

Nonferrous metals will also corrode in salt and freshwater environments. Generally, however, the corrosion and ultimate damage to these metals is less severe than that which occurs to ferrous objects.

It is obvious that an extremely complex array of natural processes are operating within the study area which may impact shipwreck sites. These processes demonstrate a great deal of variability in terms of space and time and in terms of the nature of their impact on shipwreck resources. Some processes, such as subsidence and sedimentation, can serve to protect and preserve shipwrecks, others, such as erosion, will normally result in a damaging impact on them. It is presently impossible to specify with certainty what the impacts of various natural processes on each and every shipwreck will be over a given area. Eventually, each wreck site will have to be considered individually in terms of its current setting and site-specific geomorphic history.

While it is evident that certain natural processes will seriously damage or remove shipwrecks in many situations, it is apparent from the data at hand that surprisingly good preservation of wrecks can occur in the study area. The several well-preserved historic boats found buried and partially submerged along Bayou Shaffer (Pearson and Saltus 1991) and the remains of the eighteenth century wreck of the Spanish merchantman *El Nuevo Constante* and many of its cargo items (Pearson and Hoffman 1995) provide testimony to what is anticipated will occur many times over within the study area.

CHAPTER 3

NAVIGATION HISTORY OF THE STUDY AREA

Introduction

This chapter presents an overview of the settlement history and the history of watercraft use within the study area. This background serves to identify the potential that the area has for containing the remains of sunken vessels. No attempt is made to treat other aspects of the region's cultural history in any detail; such information can be found in the studies referenced in Chapter 1. The period of concern in this study begins with the coming of Europeans into the region, circa 1718; therefore, the prehistoric period is not of major consideration. However, the waterborne activities of the prehistoric inhabitants require brief mention because the early French travelers and settlers in the area did adapt a native vessel form, the dugout canoe (called *pirogue* by the French), and did follow many native water routes. The major concern of this chapter is with the navigation history of the study area since 1718. However, an overview of the settlement history of the region is presented to provide a framework for understanding how peoples have utilized the study area over the past 280 years. Within this discussion of settlement, some information on watercraft and waterborne activities are provided as deemed necessary, although the majority of this information is included in the discussions on navigation history.

Over the past 10 years a number of studies have appeared that provide information on prehistoric and historic settlement and use of the Atchafalaya Basin. Probably the best synthesis on human history in the basin is found in Jon Gibson's work (Gibson 1982). Other studies resulting from cultural resources management projects provide information on the prehistory and history of the basin and the surrounding area (e.g., Castille et al. 1990; Goodwin et al 1985a, 1985b, 1986; Weinstein and Kelley 1992). In addition, a large body of literature is available that deals with the Acadians of south Louisiana. Of particular pertinence are the works that deal with Acadian life in the Atchafalaya Basin (e.g., Comeaux 1972, 1978; Conrad 1978; and Knipmeyer 1956). Details on the human history of the Atchafalaya Basin can be found in the works referenced above.

Settlement History of the Study Area

Because of its wet and swampy nature, much of the study area (e.g., the lower Atchafalaya Basin and coastal marshes) has always been inhospitable to human settlement. The archeological record indicates that much of the prehistoric settlement of the region was confined to the fringes of the basin and to a few areas of high ground (primarily natural levees) within the interior (Gibson 1982) and in the marshes to the south (Weinstein and Kelley 1992). The Atchafalaya Basin is, however, a rich ecosystem and there is no doubt that prehistoric populations utilized it extensively for hunting, fishing, and collecting. Access into and across the basin and in the coastal marshes would have been entirely dependent upon water transportation. Many well-es-

tablished water routes were in use by the native inhabitants of the area when Europeans first arrived. Use of these waterways certainly extended well into the past. All of the available historical and archeological evidence indicates that the watercraft used by aboriginal groups in Louisiana was the dugout canoe or, as it came to be called by the French, the *pirogue.* These canoes were made from single logs, usually cypress, and, based upon the few examples known from Louisiana, were often up to 30 ft or more in length (Pearson et al. 1989). Over millennia of use in the study area there is no doubt that many of these canoes were lost or abandoned and remain buried and preserved in the anaerobic environment produced by the thick sediments of the area.

Historic Indian Occupation

Two principal Indian groups occupied the study area at the time of European contact, the Atakapas and the Chitimacha. At the beginning of the historic period the Atakapas resided, primarily, west of Bayou Teche, inhabiting the area of southwestern Louisiana from the Vermilion River to the lower Sabine River. The name "Atakapas" means "man eaters" and was given them by Mobilian or Choctaw speaker because of their purported practice of cannibalism. The Atakapas were comprised of several bands, two of which at various times lived along the western fringe of the study area. These two bands, known as *Hikike Ishak,* or "Sunrise People," resided along upper Bayou Teche, and along western Grand Lake, as well as areas just to the west and southwest (Kniffen et al. 1987:46). The Atchafalaya Basin, initially, isolated the Atakapas from the French settlements along the lower Mississippi River, but by the 1730s trade between the two groups was occurring. By 1760, the effects of European diseases and encroaching settlement had significantly decreased the Atakapas population and forced them to withdraw westward. By 1830, a handful of Atakapas may have resided on the lower Mermentau River, but they were entirely absent from their former eastern range (Kniffen et al. 1987:75).

The Chitimacha Indians, who now reside near Charenton, Louisiana, on Bayou Teche, were reported to have occupied portions of the Atchafalaya Basin during the early years of European exploration and settlement of the region. It is unknown when the Chitimacha first settled in the basin. In the early years of the eighteenth century, the French found Chitimacha villages on Bayou Lafourche and Bayou Teche, but there is a possibility that some of the settlements in both areas were recently established. For example, when Bienville made his first journey down Bayou Lafourche in 1699, the bayou was called "River of the Ouachas," after the Ouacha Indians who, apparently, lived along it and in the marshes to the east (Pearson et al. 1989). Sometime between 1702 and 1705, the French officer, Louis Juchereau de Saint Denis lead a slave raid on a Chitimacha Indian village on Bayou Lafourche. Contemporary accounts of this raid refer to Bayou Lafourche as "River of the Chetimachas," suggesting abandonment of Bayou Lafourche by the Ouacha and/or occupation of it by the Chitimacha very soon after the French came into the area.

The French and Chitimacha were at war with one another for many years, until a peace was concluded in 1718 (Swanton 1911:342). As a result of the war, numerous Chitimacha were taken as slaves by the French. The conflict with the French may have been one of the reasons that some Chitimacha moved west from the Bayou Lafourche area to Bayou Teche and into the Atchafalaya Basin. Also, the hostilities between the French and the Chitimacha prevented any real travel into the Atchafalaya Basin region by the French until after 1718. In 1881-1882, Albert Gatschet (1883), while compiling ethnographic data on the Chitimacha Indians, collected a list of fifteen Chitimacha settlements. Swanton (1911:343-344), subsequently, reported the locations of 13 Chitimacha villages in the region, relying partially on Gatschet and partially on information provided by Chitimacha chief Benjamin Paul. Although these village locations are generally believed to have been occupied in the eighteenth century, at least one researcher contends that the Indian occupation at some of the villages may have lasted into the nineteenth century (Gibson 1978:12). Several of these settlements were located either near or within the study area, although the specific locations of most of them have not been determined.

Among the villages identified by Swanton was *Ku'cux na'mu^*("cottonwood village"), reportedly located on Lake "Mingaluak" (Mongoulois), near Bayou Chene in the middle of the Atchafalaya Basin toward the upper end of the present study area. The name "Mongoulois" was apparently first recorded by Thomas Hutchins, who visited the Atchafalaya region in 1772 or 1773. Hutchins reported an old Indian village called "Mingo Luoac" about 10 mi upstream from the mouth of Bayou Teche (Hutchins 1968:46). This village was headed by an individual called "Mingo Luak," a Mobilian Indian term for

"Fire Chief." The village of Mingo Luak, as shown on an unidentified circa 1780 French sketch map of Bayou Teche, is located on the east side of Bayou Teche below Irish Bend (Goodwin et al. 1985b:207). Presently, Lake Mongoulois is a portion of the Atchafalaya Main Channel, located north of its intersection with Bayou Chene. Although the eighteenth-century location of the village does not correspond with the current place name locale, the lake has certainly derived its name from the individual named Fire Chief.

Castille et al. (1990) provide data showing some Chitimacha residing in the Bayou Chene area until about 1900. By this date most of the Chitimacha had apparently moved to Bayou Teche near Charenton where the majority of the Chitimacha have continued to reside to the present day.

Colonial Period, 1718 to 1803

Except for aboriginal groups, the interior of the Atchafalaya Basin was occupied only intermittently until the early part of the nineteenth century. The area was visited infrequently, and the basin, with its vast swamps and water bodies, was viewed more as an obstruction to east-west travel than as a place for settlement. Intrusion into the lower Atchafalaya Basin region by Europeans began with the French during the early decades of the eighteenth century. Initial French activity in the region was undertaken by parties of exploration and later by traders and hunters, many involved with the indigenous populations, who in the lower Atchafalaya Basin were primarily the Chitimacha Indians. The vast majority of the basin was low and swampy, and therefore considered undesirable for farming, particularly as compared to the Mississippi River natural levees to the east and the Teche ridge to the west. The earliest permanent European settlements in the Atchafalaya Basin consisted of *vacheries*, or cattle ranches, many of them located on the Teche ridge, at the western periphery of the study area. These settlements were made after the Spanish acquisition of Louisiana in 1763. The Spanish interest in exploiting the colony's rich agricultural potential was expressed in liberal immigration and land granting policies. In 1765, the *Poste de Attakapas* (present-day St. Martinville) was established on the wide natural levees of Bayou Teche by Acadian refugees who had begun to arrive in the area in the late 1750s. This settlement was the center for what was called Attakapas District, originally comprised of present-day St. Martin, Iberia, St. Mary, Lafayette, and Vermilion parishes. Later, in 1778, a small settlement was established at New Iberia, and throughout the Spanish period (1763-1803) immigration into the area continued and settlement along the natural levees of Bayou Teche and Bayou Boeuf grew and expanded. The first census of the Attakapas District, made in 1770, recorded 166 whites and 33 slaves, reflecting the still sparse settlement in the region (Goodwin et al. 1985b:34). These early settlers were primarily subsistence farmers or cattle ranchers, and many certainly visited the adjacent Atchafalaya Basin swamps as trappers, hunters, and fishermen, and also to extract cypress and live oak timber.

Since the eighteenth century, the primary access to the central portion of the Atchafalaya Basin was through Bayou Plaquemine. This waterway was cleared and deepened in 1770 in an attempt to improve the east-west link between the Mississippi River and the Bayou Teche region (Comeaux 1972:9). Several routes through the basin were established; these have changed through time as channels silted in, log jams formed, and alternate means of transportation (e.g., railroads) became available. The eastern terminus of all water routes was the Mississippi River, either at Old River or at Bayou Plaquemine. Their western terminus was either Bayou Courtableau or Bayou Teche through the Lower Atchafalaya River, near present-day Patterson or Morgan City (Gibson 1982:110-111; Comeaux 1972:9-10).

A major water route into the lower part of the Atchafalaya Basin was through the Atchafalaya River, either from the Gulf of Mexico or via several intersecting waterways from the east (e.g., Bayou Black and Bayou Boeuf). One of the earliest descriptions of the natural setting and settlement of the lower portion of the study area (the Atchafalaya Bay/Morgan City area) is provided in a 1785 account of the Spanish pilot José de Evía. Evía, involved in a survey of the coast west of the Mississippi River, arrived off of Atchafalaya Bay in May 1785 with two schooners, *Grande* and *Chica Besana* (Hackett 1931:352). On May 24, Evía rounded "*La Ultima*" (last) island of the Isles Dernieres and began to encounter extensive oyster beds. On the following day he reported:

> I set sail with a fresh wind from the north-northwest in 6 or 7 feet of water, in order to approach the coast. At half past six in the evening I anchored in six feet over oyster beds, the point [of land] six miles away bearing to the north-northwest. On the 14th day I remained at an-

> chor in order to locate all the shoals which extended to the Punta del Fierro [Hackett 1931:354].

The Punta del Fierro referred to by Evía is probably Point au Fer, the point of land at the eastern entrance to Atchafalaya Bay and the site of a light house during much of the nineteenth century.

Evía provides a description of Atchafalaya Bay, specifically giving information on sailing conditions and landmarks needed to reach the mouth of the "Chafalaya" (Atchafalaya River, meaning "long river" in Choctaw). He was able to ascend to "the first settlements" which he noted were four leagues above the mouth of the river. From this anchorage he set out in a pirogue and traveled to " Los Atacapas, to the house of the commandant, Don Alexandro de Declouet, which was 35 leagues from the said place" (Hackett 1931:355). Evía and his party soon departed the Atchafalaya and continued west along the coast. Interestingly, during this voyage he commented on the wreck of the Spanish frigate *El Nuevo Constante* which he discovered at the mouth of "Bayou del Constante." The *El Nuevo Constante*, lost in 1766, was rediscovered in 1979 and its history and archeology have been well documented (Pearson and Hoffman 1995).

On his return to New Orleans, Evía and his party again stopped at the Atchafalaya River. This time he acquired pirogues and men and traveled to New Orleans via inland waterways, although he doesn't specify the exact route he took.

The earliest documented European settler in the Morgan City-Berwick area seems to have been Thomas Berwick, Sr., a native of Philadelphia who came to the Attakapas area in the 1760s as a surveyor (Weinstein and Kelley 1992:44). Berwick had helped lay out the towns of Opelousas and New Iberia before moving to the lower Atchafalaya River sometime after 1784, settling on Tiger Island, on the eastern bank of the river (or, more accurately, on the eastern side of Berwick Bay, as the stretch of river between the juncture of the Teche and Bayou Boeuf is known) at the location of present-day Morgan City (Goodwin et al. 1985b:34; Peltier and Lehmann 1960:11). A map compiled by Don Juan De Langara in 1799, relying largely on information collected by José Evía, shows the individual settlements along the Atchafalaya (or Teche). What is probably the Thomas Berwick settlement is labeled "1ª Havitacion," or first habitation, near the mouth of the river. In 1797, Berwick's wife, Eleanor Wallace Berwick, and one of his sons, Joseph, received a Spanish land grant with a 70-arpent frontage on "the river Teche" (Peltier and Lehmann 1960:11). This tract apparently includes the land presently occupied by the town of Berwick.

The Langara map shows another settlement slightly north of Berwick's. This may represent the habitation of Peter Henry Renthrop, who, in the early 1800s, operated a ferry at the juncture of the Atchafalaya River and Berwick Bay or that of John Muggah who had a plantation and an inn along the lower Atchafalaya River near the present town of Patterson (Weinstein and Kelley 1992:44).

The early settlers to this region found that the wide and fertile natural levees of Bayou Teche presented the most desirable land for settlement. In addition, the slow flowing bayou provided a safe and convenient route for moving goods and people. In 1762, there were more than 400 persons living in the Attakapas District, most along Bayou Teche, the natural levees of Bayou Sale, Boeuf and Shaffer and along the shores of Berwick Bay (Saltus et al. 2000).

During the late 1700s, groups of Houma Indians began moving down Bayou Lafourche from their settlements on the Mississippi River near the present community of Burnside. Whether the Houma displaced some of the resident Chitimacha groups or simply occupied an area already abandoned by the Chitimacha is not clear. The Houma initially settled along Bayou Terrebonne, principally in and around the present city of Houma. Oral tradition suggests that one main village, called *Chufahouma*, was established at that time (Bowman and Curry-Roper 1982:22), however, it is more probable that the Houma population was scattered along several bayous in the area. By the early 1800s, Houma families had spread from the area around Bayou Terrebonne east to Point Aux Chenes and west down Bayou du Large, located in the Terrebonne Marsh section of the study area. In 1907, the Bayou de Large settlement consisted of 12 to 14 houses of 84 to 98 people (Swanton 1911:291) and was centered around the present community of Theriot. By 1941, the du Large settlement had increase to 21 families, plus some Houma were living along Bayou Boeuf near Morgan City (Weinstein and Kelley 1992:46)

Antebellum Period, 1804-1861

Throughout the late 1700s both the population and economy of the region continued to grow, principally in relation to the clearing of land for agri-

cultural purposes. In 1803, Louisiana was transferred from Spain back to France as the political situation changed with the ascendancy of Napoleon. France's economic and political situation forced her to abandon much of her New World holdings and in 1804 she sold her immense Louisiana colony to the United States for $15 million. The transfer of ownership initially had little effect on the inhabitants of the Atchafalaya District. Louisiana was admitted to the Union in 1812, and, soon after, withstood the planned British invasion in December 1814 and January 1815 during the closing moments of the War of 1812. Beginning in the first decades of the nineteenth century there was a shift in the economic base of the region, leading to the development of a plantation economy. Technological improvements in the cultivation and processing of cotton and sugar led to their rapid acceptance as the primary commercial crops throughout southern Louisiana. The cultivation and production of indigo, which had been important in earlier years, soon ended because of insect blights and economic problems. As early as 1806, sugar can is reported to have been grown in the Attakapas district, and by the 1830s sugar cane had become the dominant crop. Soon, much of the elevated natural levee lands in the Atchafalaya Basin area was converted to its cultivation. To serve the governmental needs of the region's expanding population, the region was divided into political districts which, in turn became parishes. Much of the eastern portion of the study area was originally established as a part of the Lafourche District and the western part as a portion of the Attakapas District. In 1807 Assumption and Lafourche parishes were created out of the Lafourche District. In 1811, St. Mary Parish was formed from St. Martin Parish, a former segment of the Attakapas District. Later, in 1822, Terrebonne Parish was created out of Lafourche Parish (Weinstein and Kelley 1992:46).

When Lieutenant Enoch Humphrey of the U.S. Army passed through the Berwick Bay area in 1805, he reported six families living there (Saltus et al. 2000:24). In 1819, as noted earlier, John Landreth and James Cathcart, traveled through the area making a survey for timber resources (Newton 1985). The journals of this expedition provide considerable detail on the settlement in the study area. They note the presence of settlements along Bayou Boeuf and on Avoca Island, which they refer to as "Cowpen Island." They provide a considerable amount of detail on Bryant's Plantation at present-day Morgan city, on Berwick's Plantation at today's Berwick, and on Renthrop's Ferry. Their description of Renthrop's place is of some interest because it was probably representative of the small homesteads of the region, plus the family operated a ferry, one of many in the region. In his journal, James Cathcart noted:

> . . . Mr Renthrop & his Son are Taylors natives of Westphalia, came to Philadelphia some years ago & traveled through many places in the United States since, & about . . . nine years ago settled upon this spot, they keep a tolerable good table for this part of the world, their beds are clean, provisions wholesome, liquors Whiskey, taffia & bad claret, they are obliging but wholy Illiterate. Their farm is not very extensive, but their garden is productive, they raise poultry & hogs in abundance, & some fine cattle, & this is the first place we have had milk with our coffee since we left New Orleans; . . . the land everywhere is rich alluvion, capable of producing every necessary of life, & many of the luxuries; but owing to the prevalence of slavery, the whites are lazy, & in general dissapated, & confine themselves to the culture of cotton & sugar. . . . [Pritchard et al. 1945:795-796].

Landreth, in his journal, described Renthrop's ferry, noting that it consisted of "two cannoes fixed about three or four feet apart connected by a platform raised upon them upon which . . . . Platform they carry Horses or cattle . . ." (Newton 1985:796).

In order to maintain ownership of their property, settlers in the region had to file land claims with the American government following its acquisition of the territory in 1803. The information in these claims, recorded in the *American State Papers*, provides useful facts on the population of the region during this period. Weinstein and Kelley (1992) have reviewed much of the American State Paper data for the area around Morgan City, Bayou Boeuf, Avoca Island and in the Terrebonne Marsh area. For instance, Samuel Russel Rice submitted a claim for a tract of land of 650 acres at present-day Morgan City, where he had resided and cleared land prior to 1803.

Samuel Rice also claimed land on Avoca ("Cowpen") Island, probably just across Bayou Boeuf from his other property. Settlement on Avoca Island seems to have begun in the early years of the nineteenth century. The surveyor Landreth reports a "small settlement of white people [,] John Henry a Dutchman and Alexander Grosure a Frenchman" on the eastern end of Avoca Island in 1819 (Newton

1985:64; Kelley 1988:31). James Cathcart noted that the western portion of "Cowpen" (Avoca) Island was claimed by Samuel Rice who lived across Bayou Shaffer on what is now Bateman Island (Prichard et al. 1945:792). Rice located his habitation on the northern end of the island, facing the juncture of Berwick Bay with Bayou Boeuf (Kelley 1988:39). Bateman Island appears as Rice's Island on many nineteenth-century maps.

In 1825, Samuel Rice sold his Cowpen Island (Avoca Island) property to William Washington Wofford, Sr., a native of South Carolina (Kelley 1988:39). Wofford established a sugar plantation on the natural levees along the northern end of Avoca Island, placing his residence, sugar house, and quarters at the northwestern corner of the island, at the juncture of Bayou Shaffer and Bayou Boeuf. No doubt landings and sugar docks were located along the banks of both bayous in this area. In 1901, Wofford's Avoca Island plantation was acquired by Captain John Newton Pharr, one of the largest sugar planters in the area (Kelley 1988:43). Pharr was also involved in the lumber and shipping businesses and came to own several steamboats that plied the waters of the area.

The site of the present-day town of Morgan City on Tiger Island, originally settled by Thomas Berwick, was later acquired by Dr. Walter Brashear between 1809 and 1817. Brashear donated his lands to his children, Robert B., Thomas T., and Francis E. Brashear in 1842, and in 1853, they had a plan drawn up to divide their holdings into lots within the "Town of Brashear." In 1860 the Louisiana legislature granted incorporation status to the town, known as Brashear City (Goodwin et al. 1985a:60). Brashear City became an important regional center of trade because of its location near the mouth of the Atchafalaya River at its junction with Bayou Teche and Bayou Boeuf. In 1857 the New Orleans, Opelousas, and Great Western Railroad was completed from Algiers, on the Mississippi River opposite New Orleans, to the east bank of the Atchafalaya River at Brashear City. The railroad ended at the Atchafalaya River for many years and people and goods had to be transported across the river by ferry or barge. Charles Morgan, railroad and shipping magnate, purchased the bankrupt New Orleans, Opelousas, and Great Western Railroad after the Civil War and shifted his gulf coast steamboat operations out of New Orleans to Brashear City (Pearson and Simmons 1995:58). Merchandise and passengers would be carried by train between New Orleans and Brashear City, where the steamers would be met. This eliminated the almost 200-mi round trip on the Mississippi River that the steamships formerly had to travel to reach New Orleans.

Along the lower reaches of Bayou Teche, the area around present-day Franklin was laid out in lots by Hugh Latiolais in 1808. Originally called Carlin Settlement, the town was named Franklin in 1817 and, two years later, it reportedly was a village of 15 or 20 houses. Many of the early settlers of Franklin were of British descent, as opposed to the Creole and French populations of most of the region. By 1830, Franklin had a population of 800 persons and had become an important port, principally because it was accessible to large sailing vessels coming in from the Gulf of Mexico. The town became a center for the receipt and export of goods for the entire Teche region (Saltus et al. 2000:25).

Weinstein and Kelley (1992:55-56) discuss two early land grants in the area of Bayou du Large which apparently represent modified forms of a Spanish grant known as a *sitio*, a grant officially intended to measure approximately one league on each side. One of these claims was made by Joseph Felice, who indicated that he obtained the land on December 29, 1794, from the Baron de Carondelet (Lowrie and Franklin 1834:267). The claim for the other sitio was filed by Joseph Gabon, who also stated that he received the land from the Baron de Carondelet in 1794.

While settlement expanded onto the most desirable lands (i.e., the most expansive areas of natural levee) in the lower Atchafalaya region during the early decades of the nineteenth century, much of the lower Terrebonne area was still a wilderness. Michel Theriot, reportedly, established the first sugar plantation on Bayou du Large in 1839. As late as 1841, when the Robichauxs settled near Montegut on Bayou Terrebonne, the region was described as "a complete wilderness...and nearly all kinds of wild animals abound, deer, bear, etc., Houma consisted at that time of three or four little houses" (Becnel 1989:12-13). Originally established around what is believed to have been one of the Houma Indians' principal villages, the actual town of Houma developed on land claimed by Joseph Hache. Houma became the seat of Terrebonne Parish in 1832, although the first actual buildings in the town were reportedly not erected until 1834 and up to 1847 settlement was confined to the south bank of Bayou Terrebonne. The corporate limits were expanded to include the north bank of the bayou in 1899 (Castille 1983:2). Although it was not the first town estab-

lished in Terrebonne, Houma soon became the largest and has remained the principal urban center in the parish to this day. It was during the 1830s and 1840s that sugar cane cultivation began to dominate the region and it remained the major industry until early in the present century. By 1851, there were over 100 large sugar plantations with 80 sugar houses in production in Terrebonne. There were twelve sugar plantations on the lower Terrebonne and in 1891 the great Terrebonne Sugar Mill opened at Montegut (Wurzlow 1985:VII:58).

Many of the sugar planters who flocked to the Lafourche and Attakapas Districts in the 1820s and 1830s were Anglo-American immigrants, attracted by cheap, available land and anticipated high returns on sugar. Many of these new residents, unlike most of the local small farmers, had access to substantial capital, a necessity in establishing a sugar plantation because of the high costs for land and slaves, grinding and processing equipment, and the sugar house (Taylor 1976). One of Louisiana's principal areas of sugar cultivation and production was along the banks of Bayou Teche and centered around the towns of Franklin and New Iberia (Heitmann 1987:8-9). Gradually, as the new American planters began to profit from their investments and expand their holdings, the wealthier Creole landowners began to shift to sugar production. For example, by 1828 there were 99 sugar plantations in the Attakapas District, increasing to 162 the following year (Sitterson 1953:25) and during the years preceding the Civil War, sugar cultivation had spread to almost all of the arable land in the region. Bayou Teche, ultimately, became the seat of some of the wealthiest sugar planters in the state and the bayou became an important waterway for commerce and travel.

Settlement in the Interior of the Atchafalaya Basin: Bayou Chene

The interior of the Atchafalaya Basin, like the lower Terrebonne marshes, with minimal areas of high ground suitable to farming, was generally avoided for settlement. Most of the activities within this vast swampy area were associated with hunting, fishing, trapping and, particularly during later periods, lumbering. One area that was settled was Bayou Chene, located in St. Martin Parish in the northern part of the study area (Castille et al. 1990). Although the date of the original settlement of Bayou Chene by Europeans is difficult to determine, the evidence supports a significant occupation by at least 1841. By that date, at least 16 individuals were homesteading along Bayou Chene, Bayou Crook Chene or Bayou de Plomb. Settlement had occurred on nearby Bloody Bayou Pigeon (also called Bayou Chene during the early-nineteenth century) prior to 1838 (Castille et al. 1990). These early settlers were attracted by the elevated natural levee lands along these bayous, among the few parcels of land in the interior of the Atchafalaya Basin that were high enough to be suitable to agriculture, and certainly among the most extensive. There is no doubt that the expanse of elevated natural levee in the Bayou Chene-Bayou de Plomb area is what had attracted a concentration of Chitimacha Indian settlements to this same area at an earlier date. In conjunction with elevated viable land, settlement of the Bayou Chene local was made desirable because the bayou represented one of the important links in the navigable water routes passing through and across the basin.

During the mid-nineteenth century, the Bayou Chene community comprised the largest concentration of people living in the core of the Atchafalaya Basin. By the 1840s, farming was the major source of income, and several small sugar plantations had developed (Comeaux 1972:14-15). Small quantities of sugar were produced along Bayou Chene, and other small channels in the basin, between 1841 and 1874. Most sugar planters can be identified because they are listed in sugar production records compiled by L. Bouchereau and P.S. Champomier. Sugar planters who can be accurately located in the Bayou Chene area include: Carlin, Urbin Carlin, Henry Rentrop, Auguste Lafontain (or Lafontaine) and J.B. Anger. All of these individuals received homesteads by 1841, had their land claims approved in 1848, and were producing sugar in 1850. The early land claims in the Bayou Chene area varied in size from about 43 ac to a little over 200 ac; some individuals were issued more than one claim. In 1846, only three sugar producers were listed for Bayou Chene, and together they produced 130 hogsheads of sugar. Flooding destroyed most of the sugar crop in 1851, and a freeze destroyed it in 1857 (Champomier 1841-1859). The banner year for sugar production was 1862, when 767 hogsheads were produced (Bouchereau 1861-1875). Sugar production was abandoned shortly after the Civil War because of war-induced economic devastation, and because flooding increased in the basin as a result of the 1861 removal of a log raft from the upper Atchafalaya River (Comeaux 1972:17; Elliott 1932:51). In effect, the very same efforts that improved navigation contributed to the destruction of agriculture in the basin.

During the years of production, most of the sugar growers were using horse-powered mills. The only steam-powered mill in the area was on a plantation along Bayou L'Embarras, a few kilometers to the west of Bayou Chene (Bouchereau var. years). After abandonment of sugar production, many of the occupants who remained at Bayou Chene shifted to cypress lumbering and fishing (King 1977:17-18). These shifts in economic activities at Bayou Chene can be tracked through the Federal census records, and provide a picture of a community having to adapt to a rapidly changing environment to survive. The predominant economic activity was farming until 1860, but by 1870 this had shifted to lumber-related endeavors. This change, in part, reflects the impacts of the Civil War, such as the overall economic disruptions which occurred in the South and the loss of the slave labor force which had been an essential element to the success of many sugar farmers. In addition, however, this shift reflects the increasing difficulties encountered in conducting agriculture in the interior of the Atchafalaya Basin as flooding increased; flooding which, as noted, was in large part the result of human activities, particularly the clearing of log rafts in the upper Atchafalaya River to improve navigation. By 1900, the major occupation of the residents of Bayou Chene was fishing, reflecting the expansion of commercial fishing markets as well as a decrease in lumbering as the surplus of usable trees within the basin was depleted. The rapidly changing economic status of the Bayou Chene inhabitants reflects an adaptable population that adjusted to changing natural and economic setting conditions in order to survive. The Bayou Chene community remained intact until the devastating flood of 1927, after which the emigration increased. By the 1950s, all of the residents had abandoned the now flood-prone interior of the basin for more protected areas outside the artificial control levees (Castille et al. 1990).

The Civil War, 1861-1865

During the Civil War there was a considerable amount of military activity in the "bayou country" of the lower Bayou Lafourche, Atchafalaya River and Bayou Teche area. This activity resulted in a series of boat engagements and a number of vessels are known to have been lost or purposefully scuttled within the bounds of the study area. Because of this, a discussion of naval activity in the study area is presented later in the section dealing with the region's navigation history. That discussion includes information on the types of naval vessels involved in the region and details on those vessels known to have been lost. Here, a brief overview of Civil War activity in the study area is presented.

Louisiana seceded from the Union in 1861 and joined the Confederate States of America. New Orleans and Baton Rouge were occupied by Federal forces early in the war and became staging areas for expeditions into more remote portions of the state. Later, Confederate and Union forces both vied for the location of Berwick Bay and Brashear City (Figure 3-1). Located at the junction of two important waterways, the Atchafalaya River and Bayou Teche, as well as the only railway line in southern Louisiana, the New Orleans, Opelousas and Great Western Rail Road (N.O.O. & G.W.R.R.), the town was among the most important military locations in St. Mary Parish. Recognizing its strategic importance as the entrance to Atchafalaya Bay and the Attakapas region, in 1861 the Confederates built three forts and several smaller works to protect Brashear City. The largest were Fort Berwick, Fort Chene, and Fort Bisland. Fort Berwick was built in July 1861 on the north bank of Little Wax Bayou at its juncture with the Atchafalaya River. It was designed to prevent access, through Wax Bayou, to the marshes to the west and to the southern edge of the Teche ridge. The fort consisted of:

> An earthen fort, quadrilateral in shape with parapets five feet high on three sides, the rear being protected by palisades about seven feet high, loopholed for musketry, the whole was surrounded by a moat six feet wide in front and three feet in rear. On the front face two 24-pdr pivot guns were mounted which commanded the outlet of Wax Bayou [Casey 1983:24].

The New Orleans newspaper, the *Times Picayune*, announced in its edition of November 21, 1861, that the steamer *A.H. Seger*, under the command of Captain R.H. Kerr, was departing for "Forts Berwick and Chene." It is probable that this represents the movement of troops and supplies to the two forts. Fort Berwick was abandoned in April 1862 after the fall of New Orleans. Most, if not all, of Fort Berwick has been destroyed by the construction of the Gulf Intracoastal Waterway and a public boat launch facility.

Fort Chene was situated eight miles south of Brashear at the junction of bayous Chene and Shaffer, along the southwestern edge of Avoca Island (Casey 1983:44). This fort, constructed in 1861, contained

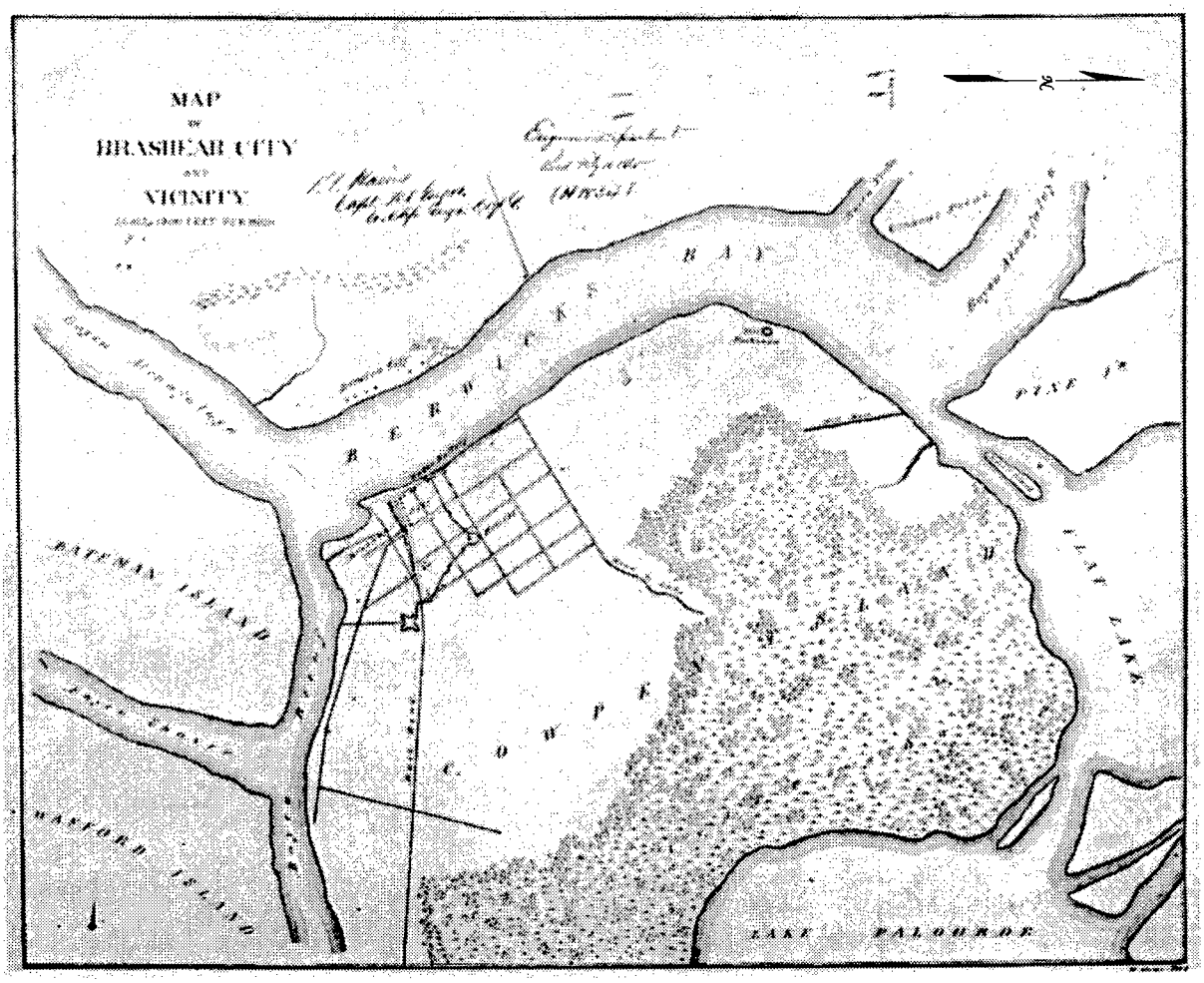


Figure 3-1. Union military installations and earthworks at Brashear City and the vicinity of Berwick Bay (source: Harris 1865, reproduced in Casey 1983:Pl. 47).

a small, central barracks area protected by an outer ditch around the earthworks (Casey 1983:44). The entrance to Bayou Chene reportedly was closed by a stockade. The armament at Fort Chene consisted, at various times, of two 24-pound pivot guns, one rifled 32-pounder, and four 24-pounders (Casey 1983:44). Like Fort Berwick, Fort Chene was abandoned in April 1862, after the fall of New Orleans. Some embankments remain at the location of Fort Chene, which may be remnants of the old fort. Fort Bisland was placed several miles up Bayou Teche outside of the community Patterson. Five smaller Confederate battery emplacements were constructed on the Brashear side of the Bay and one on the western side, at the community of Berwick.

Other defensive measures taken by the Confederates included removing all navigational aids in the Atchafalaya channel and filling it with an abatis of live oak trees, except for an 80-ft passage. Barges were prepared with additional trees to fill the gap when required. However, with the fall of New Orleans on April 25, 1862, the Confederates abandoned the fortifications in and around Brashear. The works around Brashear were dismantled and the heavy artillery reportedly dumped into the adjacent waters (Peltier and Lehmann 1960:19; Saltus et al. 2000). On May 1, 1862, the N.O.O. & G.W.R.R. was taken over by Union troops. After a few attempts by Confederate units to retake the line, the Union Army gained complete control in November 1862, and after repairs, the railroad was operated by Federal authorities exclusively for military use (Peltier and Lehmann 1960:17).

In October 1862, several Union gunboats were moved to Berwick Bay intending to cut off the retreat of Confederate troops from the Mississippi River

near Donaldsonville (Raphael 1976:42-45). The fleet, consisting of four gunboats under the command of Lieutenant Commander Thomas M. Buchanan, was delayed and the first vessels did not reach the Atchafalaya until October 30, after Confederate General Alfred Mouton and his men had escaped to the west across the river and up Bayou Teche. Buchanan's ships did, however, have brief engagement with the Confederate gunboat *J.A. Cotton* before the latter retreated up Bayou Teche. Over the next few months, the Union gunboats, supported by the Army, would fight several engagements with Mouton's troops and the *Cotton* on Berwick Bay, the lower Atchafalaya, and Bayou Teche (Pearson and Stansbury 2000). In early November, Federal forces under the command of Brigadier General Godfrey Weitzel landed at Brashear City with plans to fortify and hold the mouth of the Atchafalaya River. While the gunboats cruised the area rivers, additional fortifications were constructed in and around Brashear City (Casey 1983:32-33).

Confederate forces under the command of General Richard "Dick" Taylor, son of President Zachary Taylor, were positioned along the Teche, west of Brashear City. To prevent Union gunboats from moving up the Teche, the Confederates built fortifications along the banks and put obstructions in the bayou. The Confederates, also, stationed the gunboat *Cotton* on the lower Teche. In January, General Weitzel made an effort to move up the Teche to eliminate the *Cotton* with four Federal gunboats accompanied by "seven regiments of infantry, four full batteries of artillery, with six extra pieces, and two companies of cavalry," moved up the Teche. Ultimately, the *Cotton* was seriously damaged and many of her crew were killed or wounded. She was finally set afire and scuttled across the bayou to create an additional obstruction.

In early April 1863, a large Union force under the command of General Nathaniel P. Banks gathered around Brashear City with the intention of moving against the Confederate forces of General Richard Taylor at Fort Bisland, located several miles above on Bayou Teche. One element of the Federal strategy involved boating troops across Grand lake to its western shore where they landed and crossed overland to Bayou Teche (The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies [hereinafter cited ORA] 1885:294). Eventually, the Southern forces were compelled to retreat up the Teche; however several vessels were lost or scuttled in Bayou Teche during the course of the engagement. Also, a brief naval engagement did take place on Grand Lake during these activities. This action resulted in the destruction of the Confederate ram *Queen of the West* (formerly a Federal vessel).

With the retreat of Taylor's army from the area, Federal forces had relatively easy movement through the entire Atchafalaya Basin. Gunboats were able to move up the Atchafalaya and capture Fort Burton at Butte la Rose on April 19, by which time the Union Navy had completed its conquest of the Atchafalaya Basin (Winters 1963:234).

In June 1863, General Taylor initiated a plan to retake the lower Teche, Atchafalaya, and Lafourche regions. Part of this plan included moving troops by boat across the Atchafalaya River and down the east side of the Atchafalaya Basin to capture Brashear City. Simultaneously troops were to move down Bayou Teche. On June 23, the Confederate forces were able to force the surrender of the small Federal garrison defending Brashear City and retake the city and reoccupy the Teche region. The Confederates held Brashear City for only a month. Learning that Union gunboats were enroute to Brashear City, General Mouton abandoned Brashear and pulled back up Bayou Teche to the town of Franklin. Federal troops transferred by General Weitzel from Donaldsonville reoccupied Brashear City in force on July 25 (Saltus et al. 2000:31).

A second Union offensive into the Teche and lower Atchafalaya area began in October 1863. The objective of this assault was to take Texas by moving up Bayou Teche and then overland to the Sabine River (Edmonds 1979:5-6). Nathaniel Banks was commander of this effort, known as the Great Texas Overland Expedition. Union forces moved up to the Teche, and on to Opelousas near where the expedition was halted. Low water on the streams of the Atchafalaya Basin inhibited shipment of supplies to Union forces, and eventually the expedition was forced to retreat under harassment by Rebel troops. Union troops withdrew to the Teche and spent the winter of 1863 at New Iberia and St. Martinville. In March of the following year, Union forces again began to move up the Teche from Brashear City toward Alexandria as part of General Bank's Red River Expedition. This combined Navy and Army venture was stopped by Confederate forces under General Richard Taylor north of Natchitoches and by very low water on the Red, forcing gunboats and land troops back down

the river. The movement of troops up Bayou Teche as part of the Red River Expedition was the last major military action in the lower Atchafalaya area. Expeditions of gunboats and troop transports into the Atchafalaya Basin continued until the early summer of 1865, partially in an effort to curb "jayhawker" depredations in the region (Maygarden et al. 1997:43-47).

The coastal region of the study area saw no major engagements during the Civil War. Union ships did cruise the coast continuously after the establishment of the blockade in May 1861, suppressing most commercial maritime activity. Some blockade runners did operate out of this area, but their activities are not well documented, although Federal naval forces did intercept and capture some shipping.

Post War Period

The study area experienced a period of social disruption and economic stagnation following the Civil War. Agriculture within the Atchafalaya Basin had essentially ceased during the war (Comeaux 1972:17) and with it commercial water traffic in the region. The economy slowly began to recover and by the 1880s the economy was again stimulated by a series of events. Among the most important was the introduction of industrial lumbering. This was due to the development of several important technological innovations in timber extraction and milling in the 1880s and 1890s, plus increasing demands for southern timber due to shortages in the northeast. Numerous lumber companies moved into the Atchafalaya area and purchased or leased huge tracts of timber land and a number of sawmills, some with their own towns for workers, sprang up. Most of these companies relied on narrow gage railroads or canals to provide access into the cypress forests, plus the expanding network of railroads in the region provided an outlet for their production. The industry peaked in 1915 and rapidly declined after 1925 (Mancil 1972:85). By the 1920s, much of the virgin cypress had been cut and many milling operations went out of business or moved on the pine forests of east Texas or to the forests on the Pacific coast (Whelan and Pearson 1999). Castille et al. (1990) briefly discuss the Offit's Sawmill and Fuller's Sawmill, located in the Bayou Chene area of the central Atchafalaya Basin, and an 1881 map of the basin produced by Major C.W. Howell of the Corps of Engineers shows these two mills, plus several other sawmill locations (Howell 1881).

The late-nineteenth century, also, was characterized by the growth and expansion of fishing and other industries which relied on the natural, exploitable resources of the basin. Castille et al. (1990) have discussed the late nineteenth and twentieth century economy of the Bayou Chene community, which was similar in many ways to that of other communities in the study area. With the decline and end of sugar production at Bayou Chene in the 1860s, the residents shifted to a heavy reliance on fishing, hunting, and gathering for their livelihood (King 1977:18). The community thrived, and during the 1920s, contained about 500 people. At its peak, the Bayou Chene community consisted of several general stores, a Methodist church, a five-room schoolhouse, and residences (Case 1973:38). Like other populated areas of the Atchafalaya Basin, the end of the Bayou Chene community was preordained by the great flood of 1927, which inundated all of the basin. With the passage of the Flood Control Act in 1928, the Atchafalaya Floodway was created and the Corps of Engineers was authorized to construct levees to contain the Atchafalaya Basin. The construction of these levees forced the removal of most of the settlers within the basin. By the time levee construction began in 1936, the population of Bayou Chene was about 1000. The residents of Bayou Chene migrated either east to Bayou Sorrel or west to Bayou Benoit (King 1977:18-19) and, by 1960, the community was abandoned.

In the early 1870s, Charles Morgan began to expand his shipping operations at Brashear City. In 1871, he had a ship channel dredged through Atchafalaya Bay and the Lower Atchafalaya River in order to facilitate his steamship line. By the mid 1870s, 17 Morgan Line vessels were calling at Brashear City, which Congress had designated a Port of Entry, and Morgan's wharfs stretched for half a mile along the Atchafalaya River, and he had built warehouses, cattle pens, coal yards, and marine ways, all employing some 800 men (Pearson and Simmons 1995:91). In 1873, in recognition of the tremendous importance of Charles Morgan's endeavors, the Louisiana legislature changed the name of Brashear City to Morgan City. By the late 1870s, a significant percentage of the regional sugar and molasses production was carried from Morgan City in schooners and steamers bound for New Orleans or for ports as far away as Charleston and New York. Live oak timber from Federal timber reserves was carried out of the port to navy yards throughout the country (Goodwin et al. 1984:33). Additionally, steamers serving the communities within and on the fringes of the Atchafalaya Basin passed through or operated out of Morgan City.

In the 1870s, the Federal government, through the Army Corps of Engineers, began to take a primary role in the development and maintenance of navigation channels in the region. The Corps undertook several surveys of waterways and began to improve the navigability of others through clearing, dredging and various construction efforts.

Another impetus to the economy of the study area, particularly the coastal region, was the introduction of techniques for successful and safe oyster and shrimp canning and packing in the late 1800s. By 1905, the town of Houma had become one of the largest oyster shipping ports in the world (Castille 1983:2). Large numbers of sailing luggers, and later motorized craft, were used in the industry and individuals from almost every community, large and small, along the region's numerous waterways were involved. The oysters were unloaded from luggers by air suction and sent to steamers by conveyer to be brined and cooked in the shell. They were then mechanically shucked (Wurzlow 1985:VIII:97). With introduction of the efficient otter trawl net in the early years of the twentieth century, commercial shrimping also developed as an important regional industry.

Another impetus to the economy of the region was the development of innovations in agricultural practices, such as artificial rice irrigation and the application of new scientific techniques to cane and cotton farming. By the end of the nineteenth century, continued economic growth in the region had led to significant population increases, resulting in a shortage of land suitable for cultivation. One solution to the problem that was attempted in several areas of Louisiana during this period was land reclamation. One of the larger reclamation projects in the study area was undertaken at Avoca Island, adjacent to Morgan City, by John N. Pharr and his sons. In the 1890s, along with other plantation owners on the island, Pharr began to construct levees, dig canals and build pumping facilities to drain a large portion of the swamp and marshlands on Avoca Island. Land was drained and cultivation of the reclaimed land was initiated, but the great flood of 1927 broke several of the levees and inundated much of the island's interior (Weinstein and Kelley 1992:64). No further attempts were made to reclaim land at Avoca Island, and similar failures were experienced at other reclamation projects in the state.

The greatest social and economic impact to the study area as a whole has come within the past 50 years or so with the development of the oil and gas industry. Exploration for oil and gas has been conducted throughout the area and numerous wells have been established on the land as well as in water bodies, including the Gulf of Mexico. The region received a great stimulus from the mineral industry; employment increased significantly and the population expanded, along with the infrastructure required to support the industry and the influx of people. Morgan City and Houma developed as important regional centers supporting both the land-based and the offshore-based oil industry. Facilities related to all aspects of the oil and gas industry (e.g., docking facilities, ship building operations, oil rig construction facilities, etc.) were established or expanded at these two cities and at numerous other locations in the study area. The construction of new navigation channels and the maintenance and improvement of others, a process which began in earnest in the 1870s, was stimulated by the needs of the oil and gas industry. Although it has experienced periods of economic decline, the mineral extraction industry remains as the most important economic base in the region.

Navigation History of the Study Area

The waterways of the study area have been critical in the movement of peoples and goods since prehistoric times. The patterns of settlement and economics of the region have been dependent upon these waterways and the watercraft which used them. The following discussions provide a synthesis of the navigation history of the study area. To the extent possible, these discussions are organized chronologically, structured by the three historic contexts introduced in Chapter 1: 1) The Early Years of Navigation, 1718-1812; 2) The Era of Steam, 1812-1936; 3) Navigation in the Modern Era, post 1936. For each of these time periods, information is presented on the types of watercraft used, the primary routes of navigation followed and on the general nature of waterborne commerce for the period. As noted in Chapter 1, these three time periods do not always form neat, well-defined pigeonholes relative to the subject matter; there are many overlaps in terms of most aspects of navigation. These periods do, however, provide reasonable groupings for the needs at hand.

The Early Years of Navigation, 1718-1812

Exactly when the first European traveled into the study area is unknown, but with the establishment of New Orleans on the Mississippi River in 1718, exploration and exploitation of the vast marsh and swamplands to the west, including the study area,

became more important. In 1721, New Orleans and vicinity had a population of 1,249 including 565 black and Indian slaves (Roberts 1946:40) and the following year, the seat of government for the Louisiana colony was transferred from Biloxi to New Orleans. New Orleans quickly became the commercial center of the colony, receiving the goods from the interior by way of the Mississippi River and shipping exports down the river or across Lake Pontchartrain to the east. During this early period, most of the recorded waterborne commerce in Louisiana was centered around New Orleans and oriented northward, up the Mississippi River, or eastward to the other French settlements on the Gulf coast.

Some travel into the study area by the French certainly occurred during their long war with the Chitimacha, which ended with a peace settlement in 1719. During this war, the French undertook a number of expeditions into the territory of the Chitimacha and took away many as slaves. Details of these activities, however, were not recorded and few other early accounts of travel through the area exist. By the 1750s, French creole families in New Orleans had begun to settle and exploit the area along lower Bayou Lafourche. They used the high natural levee ridges as *vacheries*, or cattle ranches, and also exploited the region's timber resources and its numerous aboriginal shell middens. The shell was burnt to produce lime needed in construction activities in New Orleans (Pearson et al. 1989). By this time, or soon after, similar activities began to take place in the study area, particularly in the southern region in the vicinity of Bayou Terrebonne, Bayou Boeuf and lower Bayou Teche.

Some hunters and trappers were certainly entering the area by the mid 1700s. Comeaux (1972:7) notes that agents of the Spanish government were traveling in the interior of the Atchafalaya Basin in 1769, when they reported meeting two parties of Indians on hunting expeditions. There, also, was some activity along the coastal portion of the study area, but few early sailors had an interest in stopping here, most were heading to New Orleans, or sailing from New Orleans on to ports in Mexico.

In the eighteenth century there were two main water routes into the region of the Atchafalaya Basin. Both entered the eastern rim of the basin, through Bayou Plaquemine, a distributary of the Mississippi River (Gibson 1982:110-111). Comeaux notes (1972:9) that Bayou Jacob, a small bayou paralleling Bayou Plaquemine for some distance, was actually the first route used by Europeans, apparently because Bayou Plaquemine itself was choked by logs. In 1770 Bayou Plaquemine was cleared and deepened and remained a major water route into the present. There is no doubt that the Bayou Plaquemine/Bayou Jacob route also served the area's aboriginal populations. The northern of the two early Bayou Plaquemine routes "followed Bayou Plaquemine to Bayou Grosse Tete and then along Grand River, Atchafalaya River, and Bayou Courtableau to Bayou Teche at Port Barre" (Gibson 1982:110-111). This early route is depicted as early as 1806 on a map by Bartolome Lafon. His map shows the route through Grand River (labeled "Atchafalaya" on Figure 3-2), and another through Bayou L'Embarras to Grand Lake. By the 1860s, the upper Grand River segment of this route had become choked by log rafts, forcing travelers to shift southward, bypassing Grand River in favor of a longer route through Bayou Sorrel, Lake Chicot, Bayou Chene, and Bayou La Rompe to the upper Atchafalaya River (Castille et al. 1990:38).

Those traveling the southern access from Bayou Plaquemine either followed Grand River southward through Bayou Long to enter the Teche near Morgan City or traveled down Bayou Sorrel to Chicot Bay entering into the northern end of Grand Lake. From there this route continued across the lake to the Lower Atchafalaya River and on into Bayou Teche near present-day Patterson (Gibson 1982:110-111; Graham and Tanner 1834; Prichard et al. 1945). Case (1973:30-34) reports that flatboats were traveling this latter route from the Mississippi River to the lower Teche as early as 1795. These flatboats carried merchandise as well as settlers and their property into the region.

Several other minor routes also were in use. One used Bayou Pigeon to cross the interior of the basin and one connected the Lower Atchafalaya River to Grand River through Lake Palourde. About 1810 the Attakapas Canal was dug, providing access from Bayou Lafourche to Lake Verret and, thus, to the lower Atchafalaya Basin and the area of Bayou Teche to the west (Prichard et al. 1945:757). During this very early period, travel into the Atchafalaya Basin via the Atchafalaya River from the Gulf of Mexico occurred, but it was not until later that this approach became important, particularly, for larger vessels traveling to and from New Orleans and other ports on the Gulf coast and over seas.

By the 1760s, settlement was expanding onto the larger natural levee ridges in the study area. Much

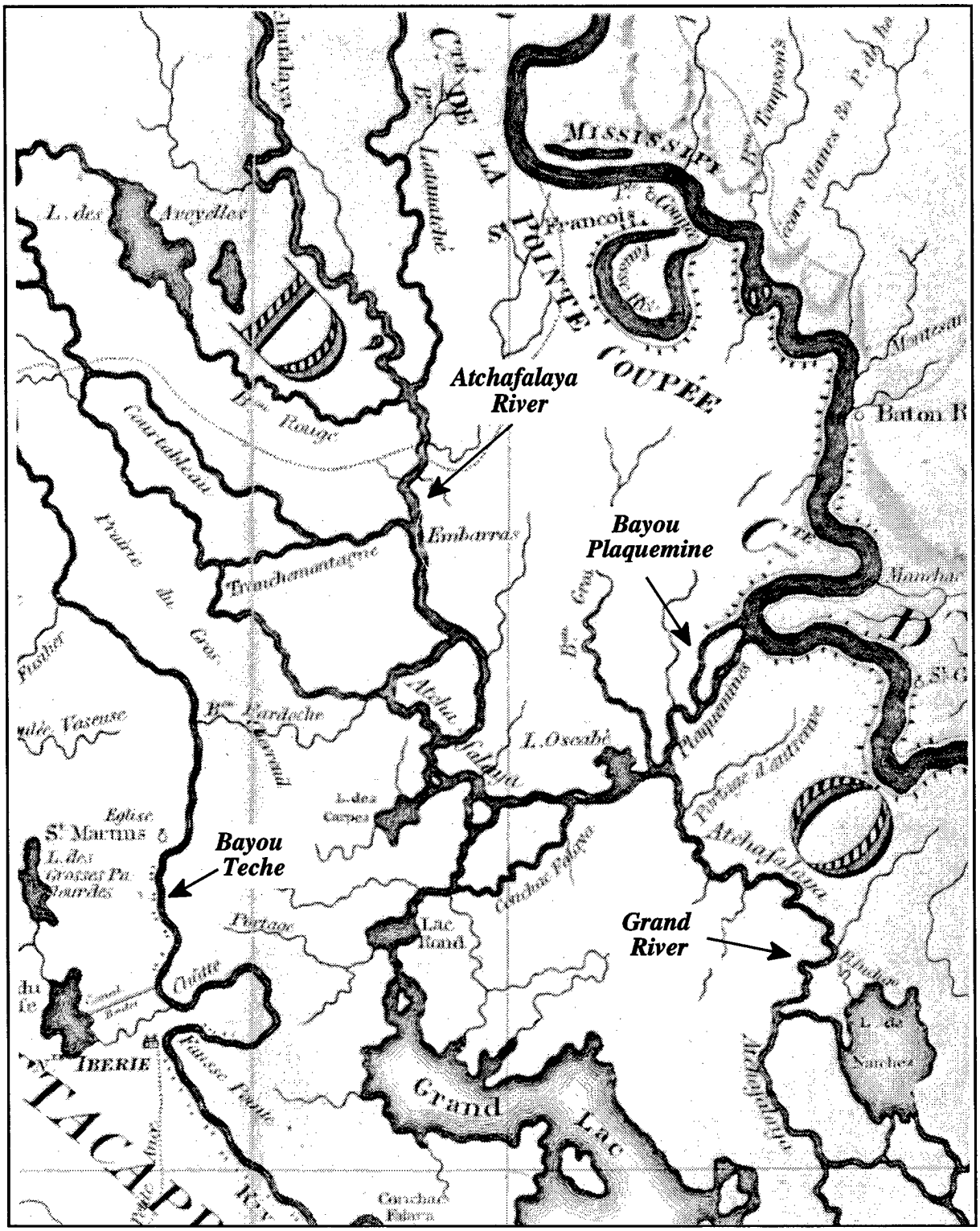


Figure 3-2. Detail of the 1806 Bartolome Lafon map showing waterways in the Atchafalaya Basin. Labels added (source: Cartographic Information Center, Louisiana State University, Baton Rouge).

of the early settlement in the area was concentrated on the natural levees of Bayou Teche, known as the Teche ridge, at the western periphery of the study area. In 1765, the *Poste de Attakapas* (present-day St. Martinville) was established by Acadian refugees who had begun to arrive in the area in the late 1750s. This settlement was the center for what was called Attakapas District, originally comprised of present-day St. Martin, Iberia, St. Mary, Lafayette, and Vermilion Parishes. Throughout the Spanish period (1763-1803) immigration into the area continued and settlement along the natural levees of Bayou Teche and Bayou Boeuf grew and expanded. Despite this influx, the population in this area was sparse throughout the eighteenth century; in 1770 there were 166 whites and 33 slaves reported in the entire Attakapas District (Goodwin et al. 1985a:34).

Bayou Teche became increasingly important as a navigation route as farms developed along its banks, producing crops which needed to reach market. The waters of the bayou itself, as an underfit stream, were slow flowing and relatively easy to navigate. The main impediments to navigation were snags and logs in the bayou, and these could be easily cleared. Adding to its importance was the fact that the Teche, and its upper tributaries which include Bayou Courtableau, Bayou Cocodrie and Bayou Boeuf, provided a water route into rich and fertile agricultural lands north and west of the Atchafalaya Basin. While it is known that flatboats and keelboats, in particular, were involved in trade along the Teche in the eighteenth century, few details of this trade have been recorded. It is primarily for later years, after the introduction of the steamboat that details on trade along Bayou Teche become available.

Prior to 1765, few Europeans had settled in the coastal marshes of the study area (Watkins 1937). Beginning in 1764, Acadian settlers began to move into the region, most of them coming down Bayou Lafourche and across to Bayou Terrebonne. This migration of Acadians continued until about 1795, under the encouragement of the Spanish who had acquired Louisiana from the French in 1763. These Acadian emigrants settled along the fertile natural levee lands along the many bayous in the area and, initially, established small farms. Soon, they spread to most of the habitable natural levee lands in the region and, in addition to farming, added stock raising, hunting, fishing and trapping. These early French settlers named the region Terrebonne, which means "the good earth," in recognition of the richness of the area. Although many of these early settlers were French, Houma Indians comprised a significant number of those settling in the area around present-day Houma.

These early settlers of the study area were primarily subsistence farmers or cattle ranchers, and many certainly visited the adjacent Atchafalaya Basin swamps as trappers, hunters, and fishermen, and also to extract cypress and live oak timber. With the growth of population in the region and the development of an agricultural economy, access to the markets in New Orleans became increasingly important, and that access was by water. The importance of travel by water in the region is emphasized in statements by C.C. Robin, who traveled through the region in 1805. He noted:

> People in this country are so accustomed to travel by water that the generic term "voiture" [standard French for "carriage"] is always applied to a boat. If a Louisianian says to you "I brought my voiture"; "Can I give you a lift in my voiture"; he is referring to his pirogue or skiff as a Parisian using the same word would mean his coach [in Gibson 1982: 114].

James Leander Cathcart, who led the 1818-1819 timber survey expedition of which John Landreth was a member, provides some unique descriptions of the types of water transport in use in the region at that time. In January of 1819 he noted in reference to the area of present-day Morgan City:

> . . . the flats (so call'd) used at this ferry, are form'd of two large canoes, on which is a platform for houses, the price of carriage for a man and horse is 12 dollars, and for black cattle 1.50 cs per head they cross the lake to the canal which runs into Lake Verrett from Lafourche a distance of 30 miles, and from thence passengers proceed to Donaldsonville, and take passage in steam boats that pass either up or down the Mississippi, at the rate of 121/2 cts per mile. The flats or double canoes, row with two or more oars, and sail when the wind is fair, the rudder is on one canoe only, the pilot sits on the platform, and steers with a yoke and lines, as he would a gid or wherry [Prichard et al. 1945:796].

Cathcart's fellow traveler, John Landreth, while on Bayou Teche in March of 1819 reported that:

> . . . now the western waters are high there is a constant passing of boats loaded with the produce of the country for the New Orleans Market

> Sugar and cotton &c a number of what they call keel boats pass Franklin every day down the Teche carrying from one hundred to three hundred bales of cotton each these boats are generally rowed by Eight ten and twelve oars and a man to steer [Newton 1985:124].

During his travels across the Atchafalaya Basin, Cathcart noted a spot in Lake Natchez where "keelboats which draw less water than ours are frequently detain'd aground for 8 or 10 days" (Prichard et al. 1945:760). As these accounts reveal, keelboats were used extensively on the Teche as well as on the cross-basin journeys, especially during the early nineteenth century before the introduction of steamboats.

Boat Types in Use in the Early Period

There is no doubt that aboriginal populations of the region relied upon dugout canoes in their travels through and across the area. Numerous accounts of the use of dugouts by the native populations have been left by early French visitors to Louisiana. In addition, the remains of a number of prehistoric dugout canoes have also been found (Pearson et al. 1989). The French settlers quickly adopted the dugout canoe of the Indians, and the pirogue, as they called it, became probably the most common watercraft in the region. The French were familiar with dugouts since similar watercraft were then in use in Europe and the adoption of the native craft was easily done. These canoes were made from single logs, usually cypress, and based upon the few examples known from Louisiana, were often up to 30 ft (9 m) or more in length (Pearson et al. 1989).

A variety of other types of small boats were used on the waterways of the study area during the eighteenth, and on into the nineteenth century. Some of these types of boats continued in use until recent times. These included types such as the *chaland, esquif* and the *bateau*. The chaland is a rectangular, flat-bottomed boat, normally only 10 to 14 ft (3 to 4 m) in length. This craft was often used as a ferry, or for transporting bulky loads for short distances (Knipmeyer 1956) (Figure 3-3). The accounts of Cathcart and Landreth indicate that another type of ferry was used in the study area in the early nineteenth century. This comes from their description of Mr. Renthrop's ferry, which consisted of two "canoes," probably pirogues, connected together by a platform which served as the deck (Newton 1985:796). The esquif, or skiff, is flat-bottomed with a pointed bow and flat (or transom) stern. Skiffs were propelled by sails and/or oars. Knipmeyer (1956:167) indicates that the skiff became more popular through time as the use of the pirogue declined. The term "bateau" actually can refer to several types of vessels. The eighteenth-century bateau was normally a flat-bottomed boat, tapered at both bow and stern, which was used as a cargo carrier. Bateaux ranged from 12 ft (3.6 m) in length to greater than 80 ft (24 m); however, most were from 20 to 40 ft (6 to 12 m) long. The bateau could be rowed, poled or sailed. Large cargo bateaux were used on the Mississippi River beginning in the eighteenth century, while smaller ones were employed on the lesser streams of south Louisiana (Pearson et al. 1989:95). It is certain that some of these cargo bateaux were used on the waters of the Atchafalaya Basin. As presently used, the term bateau also refers to a large, flat-bottomed boat with a blunt bow and stern. These craft are usually over 15 ft long, 5 ft wide and sheered forward. Sometimes, the deck of bateaux are partially planked to provide a working space. This type of boat is still used occasionally in the Atchafalaya Basin.

The term *bateau plat* sometimes appears in early French records, meaning simply "flat boat," and referring to a flat-bottomed vessel which normally had a raked bow and stern. These vessels were fairly small, measuring about 40 ft long and 9 or 10 ft wide. The more typical box-shaped flatboat, which became so common on the Ohio and Mississippi River, was probably never found in great numbers in the study area. Flatboats were rectangular, flat-bottomed scows that could be up to 100 ft long and 20 ft wide, although they tended to be smaller in the early years. Some of these boats were partially or entirely decked and many had multiple rooms with brick fireplaces and chimneys. They drifted with the current and were steered with large oars called "sweeps." These flatboats were numerous on the Mississippi River from the 1780s up to the mid-nineteenth century and carried all manner of cargo and large numbers of passengers down the river. Flatboats would have been difficult to use on most of the streams in the study area, because they were either too tortuous and snag-filled, like the Atchafalaya, or were too slow moving, like the Teche and many coastal streams. However, in later years, similar craft, more accurately defined as barges and normally towed by steamboats, were used to transport cargo throughout the study area. The early barges were wooden, but these have been replaced by iron and steel examples in the twentieth century. An example of a probable

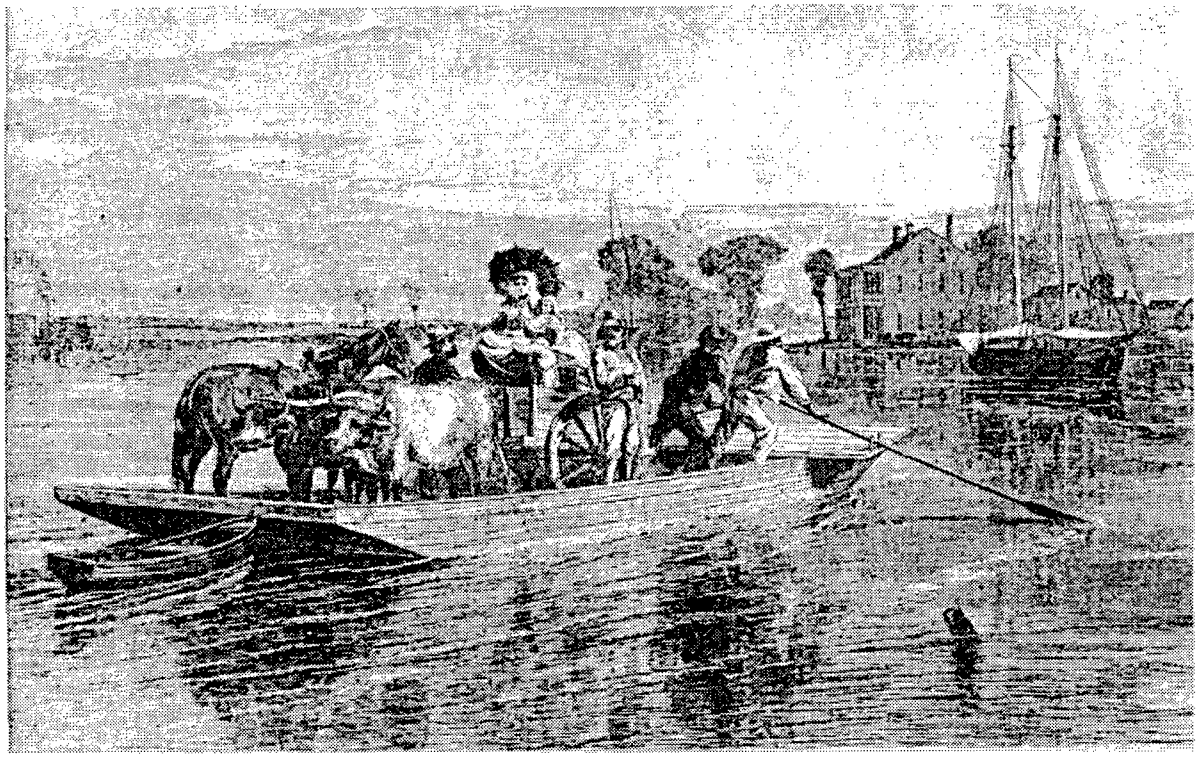


Figure 3-3. Nineteenth-century drawing at Morgan City showing several watercraft typical of the study area. These are a flatboat (*chaland*) used as a ferry, a typical river skiff (*esquif*), and a small schooner (source: Waud 1866 in Comeaux 1972:8).

nineteenth century wooden barge was discovered buried along the bank of Bayou Shaffer just south of Morgan City (Pearson and Saltus 1991:84). This barge measured 117 ft long, 26 ft wide and over 3 ft deep. A brief examination of the buried craft suggested that it had been a coal carrier. Coal was an important commodity in the region, particularly because of its common use as fuel in sugar houses.

The common characteristics of all of these vessels are that they are shallow draft, relatively small (except for the later wooden barges) and tend to be flat-bottomed. These attributes were, and continue to be, ideally suited for the shallow and often narrow waterways found in the region. Many of these small boat types remained in use in the study area until very recent years. Some remained minimally changed in form for almost 200 years. A fair amount of research has been conducted on the small craft found in the Atchafalaya Basin and in south Louisiana and the history and uses of these watercraft are reasonably well known (Comeaux 1972; Knipmeyer 1956; Pearson et al. 1989). These craft, commonly referred to in the literature as "folk" or vernacular craft, existed in large numbers and were in use for a long period of time, such that many have been lost within the study area. As noted earlier, a small number of these boats have been discovered as archeological remains in the study area (Goodwin et al. 1984; Pearson and Saltus 1991), and many more certainly exist as significant cultural resources. In light of the importance of these types of boats to the history of the study area, and because of the fact that they probably constitute the most common class of boat wreck found there, a detailed discussion on these "folk craft" is provided later in this chapter.

Keelboats were used not only on the Teche, but also on the cross-basin journeys, especially during the early-nineteenth century, prior to the introduction of steamboats. Keelboats, unlike the large Mississippi River flatboats, were designed for two-way travel; they had a shallow keel, were pointed at both ends, and the middle was usually covered by a cabin or cargo box. On the typical keelboat, a 12-to-18-in-wide cleated footway ran around the gunwales and some had seats for 4 to 12 rowers. Others were fitted with a mast and sail. Steering was done with

a long oar pivoted at the stern. Keelboats were either poled, rowed, sailed or pulled ("cordelled") upstream and, when possible, drifted with the current when going downstream. The standard keelboat carried a load of 15 to 50 tons of merchandise (Taggart 1983:92).

The following description of the keelboat and its operation was provided in the *New Orleans Daily Picayune* of August 8, 1891. Although it tends to relate to keelboats as they were used on the Mississippi River, it, also, applies to those used in the study area:

> The keelboat, called by the Louisiana Creoles *la barge*, was, however, the most generally accepted and comfortable river conveyance for freight, passengers and crops of all kinds. Like the flatboats the keelboats moved slowly, even going downstream, but the return upstream was tedious in the extreme, flatboats were always sold at New Orleans as soon as their freight was discharged, but keelboats would return to Pittsburgh, continuing from three to six months on the trip home, after having been at least six or seven weeks in going down the river.
>
> [Keelboats]. . . were "light, long and narrow, sharp at both ends and round bottomed; they were rigged with one or two 'sweeps' on each side for propelling purposes, and a sweep at one end for use as a rudder." These sweeps were rude ones of immense size, formed of young tree bodies attached to the boat by rol[?] pins, and having at their outer end a blade formed of thick plank or board. There were also one or two masts on the keel boats, thus the oarsmen, of whom three was always a full complement, could run up sails when the breeze set in the proper direction and rest themselves. Setting poles were employed to free the boats from the sand bars on which they sometimes grounded, or to push them along in shallow water, and also to force them away from accumulations of driftwood and snags which interfered with their progress. In going up stream it was found extremely difficult to overcome the force of the strong, rapid current racing downwards to reach the ocean; for this warping and cordelling were resorted to, in both processes a hawser was attached to the mast; in warping a tiny yawl was sent ahead of the keel boat carrying with it one end of the rope, this was fastened to a tree on the river bank and as the boatman pulled hand over hand by the rope to the tree station, a second hawser was tied to another tree further on, to which point the men then pulled the boat, and thus the warping continued, the men in the yawl knotting each rope to a tree alternately, those in the keelboat pulling up to the trees by the hawsers. Cordelling was frequently resorted to. In this method the heavy ropes were held at one end by men on shore, who walked along laboriously dragging the boat against current. When admissible mules were employed instead of oarsmen, thus relieving these last of an arduous task. This system was employed by the ancient Romans, who propelled their keelboats by men or oxen.
>
> There was always a contracted apartment near the stern of a keelboat, which served as its cabin. These were not only of use in giving protection to occasional passengers, but were, in many instances, the sole residences of the boat owners. Owing to this fact the latter were facetiously termed crocodiles, that is alligators, because like these reptiles, they were equally at home on land or water . . .[*New Orleans Daily Picayune* August 8, 1891].

The keelboat never existed in great numbers on western rivers and their major period of use lasted from about the 1760s to the 1820s when they were replaced by steamboats. They seem to have disappeared on the Mississippi River first, but remained in use on tributary streams for a slightly longer period of time. Castille et al. (1990:Appendix B) recorded 21 keelboats registered in the Atchafalaya-Bayou Teche region between 1805 and 1820. These vessels, with names such as *Fanny and Louisa*, *Esperance*, *Black Snake*, *Lively*, *Scorpion* and *Yellow Jacket*, hailed from Franklin, New Iberia, Opelousas, St. Martinville and Bayou Fusillier. Most of these boats were built in cities like Pittsburgh or Cincinnati along the Ohio River, or along the Cumberland River in Tennessee. These keelboats were quite large, averaging about 90 ft in length, 13 ft in breadth, and 30 to 35 tons in burden. A few keelboats were locally-built, and these tended to be somewhat smaller, measuring about 60 ft long (Castille et al. 1990:Appendix B).

New Orleans enrollment documents reveal a number of keelboats either owned by residents of the study area or with homeports in the study area well into the late 1820s. For example, for the period 1820-1830, at least 23 keelboats were enrolled in New Orleans with homeports such as "Attakapas,"

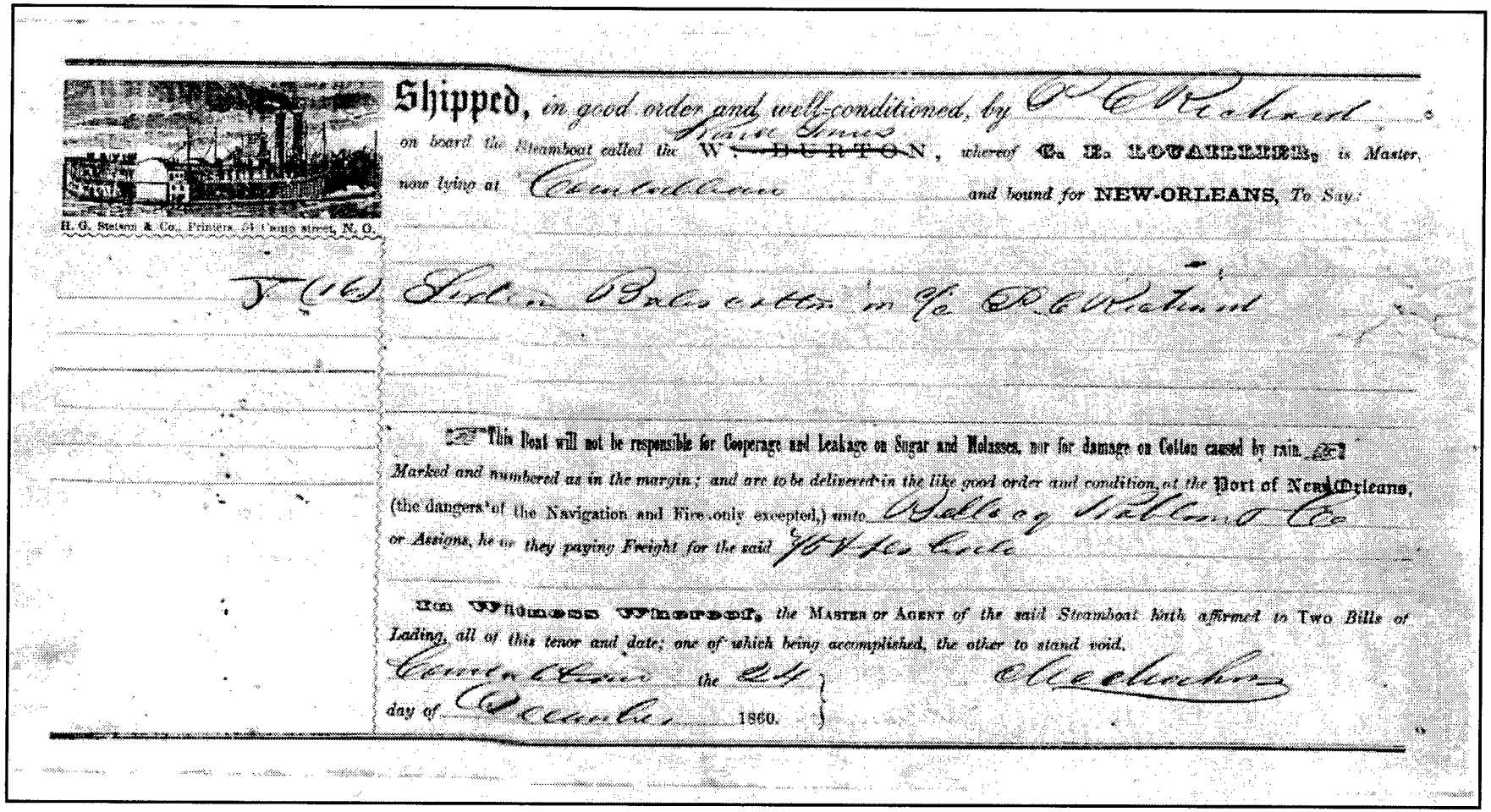
Franklin, Opelousas or St. Martinville or with owners residing at those locales. Among these was the 96-ft keelboat *Nonsuch* whose master was "Nonnoutte, a free man of color" (WPA 1942:2:114). Possibly the last keelboat to work in the area was the 101-ft-long *Bayou Boeuf* which was enrolled in New Orleans with Franklin as her homeport in April 1831 (WPA 1942:3:20).

A variety of sailing vessels were used in the coastal region of the study area and these were particularly important prior to the introduction of steamboats. The most common of these sailing craft were small schooners and sloops that typically sailed between the study area and New Orleans, bringing supplies and merchandise from the city and returning with locale produce. These sailing vessels tended to be fairly shallow draft and less than 100 tons burden. In addition to sailing into the lower Atchafalaya River and Bayou Teche via Atchafalaya Bay, these vessels traveled into many of the other waterways along the coast, such as Bayous Grand Caillou and Terrebonne. Typical of the early "coasting" vessels was the schooner *Despatch* which, in 1826, was owned by local resident Walter Brashear. The *Despatch* was built in 1823 at Onslow County, North Carolina, and measured 52 ft long, 17 ft, 5.5 in wide and of 4 ft, 8 in deep. Her burden was 35 64/95 tons. When Walter Brashear owned the *Despatch* he was listed as a resident of "Belle Isle," the location also given as the schooner's homeport (WPA 1942:2:39). Belle Isle is an island located at the upper end of Atchafalaya Bay, just west of the mouth of the Atchafalaya River (Figure 2-4). Examples of other sailing vessels typifying those involved in the early coasting trade of the study area include the 56 ft, 5 in schooner *Augustus*, built in Vermilion Parish in 1832 and homeported in Franklin; the 40 ft sloop *Exchange*, homeported in "Terrebonne" in 1834; the 37 ft, 5 in schooner *Lady of the Lake*, built in Madisonville, Louisiana, in 1820 and registered at Franklin in 1828; the 57 ft, 4 in, single-masted vessel *Hope*, described as a "felucca," enrolled in Franklin in 1819; the 57 ft, 4 in schooner *John Innis*, built at Franklin in 1804; and the 78 ft schooner *Diadem* that was enrolled at the "port of Grand Caillou" in 1837 (WPA 1942).

The Era of Steam, 1812-1936

The first steamboat on western waters was the *New Orleans*, which came down the Mississippi River in 1811-1812 arriving at the city of New Orleans on January 13, 1812. Subsequently, the *New Orleans* operated between New Orleans and Natchez carrying both freight and passengers. The steamer was a financial success until her sinking opposite Baton Rouge in July 1814. During her short career, the *New Orleans* was rumored to have earned $20,000 in excess of costs. Although these, and other reports of profits of other early boats, were much hyperbolized, they did have some basis in fact and encouraged men to try and earn a living in steamboating (Hunter 1949:21-21). There was soon a rapid and great growth in the construction and use of steamboats on the western rivers of the United States. The number of steamboats in the west rose from seventeen in 1817 to 69 in 1820 to 187 in 1830. Steamboat arrivals in New Orleans catapulted from 198 in 1820 to almost 1000 in 1830 (Pearson et al. 1989:Table 403). Steamboats quickly began to expand onto the tributaries of the Mississippi River. In January 1815, the *Enterprise* became the first steamboat to travel up the Red River in Louisiana (Pearson and Wells 1999) and steamboats soon were in use in other areas. Details on the historical and technological development of the steamboat are not presented here. This information can be found in Hunter (1949) for the western rivers in general and in Pearson et al. 1989 and Pearson and Wells 1999 for the lower Mississippi and Red rivers.

Steamboats seem to have first reached the Atchafalaya Basin in about 1819; one of the earliest was the 94-ft, 103-ton *Louisianais*, constructed in 1818 in New Orleans (WPA 1942:1:81). This boat was used mainly as a cattle ferryboat. Another early boat was the *Volcano*, a 217-ton steamer, also, used as a cattle boat. Francis Duplessis, Jr. of New Orleans was part owner and master of both the *Volcano,* built at New Albany, Indiana, and the *Louisianais,* and he apparently was an important figure in the early steamboat trade in the Atchafalaya region (WPA 1942:1:134). Duplessis had other maritime interests as well. In 1816 he was a part owner of the schooner *Rebecca* and the following year he is listed as part owner of the brig *Hibernia* (WPA 1942:I:63, 111). By 1820, the Attakapas Steamboat Company was operating the 295-ton steamer *Teche* between New Iberia and New Orleans (Goodwin et al. 1985b:184). In 1825, Captain Robert Curry brought the small, 48-ton *Louisville* through Bayou Plaquemine, across the Atchafalaya Basin to the town of Franklin on Bayou Teche (*Planter's Banner* April 27, 1848, in Gibson 1982:116). Later steamers followed the route established by Curry and, by 1827, clearing of Bayou Sorrel and Lake Chicot for navigation had begun.



H. G. Stetson & Co., Printers, 61 Camp Street, N. O.

Shipped, in good order and well-conditioned, by [illegible]

on board the Steamboat called the ~~W. BURTON~~ Nina Simmes, whereof [illegible] is Master, now lying at [illegible] and bound for NEW-ORLEANS, To Say:

16 Bales Cotton in Ye Courtableau

☞ This Boat will not be responsible for Cooperage and Leakage on Sugar and Molasses, nor for damage on Cotton caused by rain. ☜

Marked and numbered as in the margin; and are to be delivered in the like good order and condition, at the Port of New Orleans, (the dangers of the Navigation and Fire only excepted,) unto Wallace Stetson & Co or Assigns, he or they paying Freight for the said 16 Bales Cotton

In Witness Whereof, the Master or Agent of the said Steamboat hath affirmed to Two Bills of Lading, all of this tenor and date; one of which being accomplished, the other to stand void.

Courtableau the 24 day of December 1860. [illegible]

Figure 3-4. December 1860 bill of lading for the shipment of 16 bales of cotton on the steamer *Nina Simmes*, running in place of the steamboat *W. Burton* from "Courtableau" to New Orleans (source: private collection).

Steamboat use in the study area expanded rapidly. For the period 1821-1830, New Orleans enrollment documents list only two steamboats with hailing ports or owners residing in towns in the study area. In the following decade, 1831-1840, 18 steamboats enrolled in New Orleans had owners or homeports in the study area (WPA 1942). These numbers, of course, do not represent all of the steamers traveling in the area; many boats working in the region were owned by person in New Orleans or elsewhere.

Steamboat travel in the Atchafalaya Basin was seasonal; largely dependent upon high water. Fortunately, high water occurred during the winter and spring, when agricultural products (mainly sugar and cotton) were ready for shipment to market. Numerous steamers plied the waters of the Atchafalaya during the nineteenth century; some of these were regular visitors to the area, others made a single trip. While an extensive documentation of these steamboats exists in a variety of forms (e.g., newspaper accounts and advertisements; travel accounts; financial records; etc.), there are many gaps in this record. As a result, a complete listing of the steamboats that traveled in the study area would be impossible to develop. Relying on the sources examined in this study, a list of boats known to have traveled in the study area has been developed and is presented below. The list is incomplete, but it does provide information on the types of vessels using the study area, as well as on many specific boats.

Although most early steamboats used in the study area were enrolled in New Orleans, at least two steamers were registered at ports in the Atchafalaya region prior to 1820: the *Teche* in Franklin and the *Henderson* in Henderson. The *Henderson*, built in 1818 at Cincinnati, Ohio, and measuring 113 ft long and displacing 123 tons, is somewhat anomalous because its hailing port was located along the northwestern edge of the Atchafalaya Basin, an area which was not noted for substantial economic activity prior to 1820 (WPA 1942:1:61). This fact, plus the presence of three separate "Bayou Portages" along the western margin of the Atchafalaya Basin, suggests that planters and merchants of the Teche region were seeking alternate routes for getting their goods across the Atchafalaya Basin at an early date.

Bayou Teche was one of the most active waterways for commerce in the study area during the first half of the nineteenth century. The Teche and its upper tributaries, which include Bayou Courtableau, Bayou Cocodrie and Bayou Boeuf, provided a water route into one of the most prolific sugar-producing areas of Louisiana. Bayou Teche has been an avenue for waterborne commerce since the time of initial historic settlement, but it is for the period after the introduction of the steamboat that most information on this activity is available. A summary of the early attempts at steamboat navigation on the Teche can be found in Goodwin et al. 1985:

> In 1819, the only schooner that made regular trips between the Teche and New Orleans via the Balize was the *James Lawrence*. The vessel's upriver limit of travel on the Teche was New Iberia, because snags and fallen trees in the bayou prevented navigation beyond the city. The introduction of steamboats into the Bayou Teche area, credited to Francois Duplessis, Jr., and to Martin Duralde, Jr., was the major impetus to increased commerce and economic growth in the area. In 1818, Duplessis and Duralde were authorized by the state to establish a steamboat and ferry between Bayous Portage and Plaquemine (Conrad 1979a:210). Later that year, they completed construction of a 103-ton steamer, the *Louisianais,* which began operation as a cattle ferryboat in the Atchafalaya Basin in 1819. In February, 1819, the "Attakapas Steam Boat Company" was incorporated by an act of the state legislature. It was granted permission to operate a steamboat on Bayou Teche. Stock sold in St. Martinville, Franklin, and Opelousas helped to finance the firm's construction of the *Teche*, a 295-ton steamer in 1820. Although the *Teche* operated regularly out of New Iberia, and while it monopolized steam navigation on Bayou Teche in 1821, both high operating expenses and routes plagued by snags led to the failure of the Attakapas Steam Boat Co. in 1825 (Conrad 1979a:211).
>
> At that time, Captain Francois Duplessis, Jr., operated the *Volcano*, a 217- ton cattle boat, between Bayous Cypremort and Plaquemine. The *Volcano* was not sufficient to satisfy the demands caused by increasing agricultural production along Bayou Teche. The arrival of the *Louisville* in April, 1825, helped to alleviate the situation even though she was only a 48-ton steamer. Of more significant impact to the region was the route chosen for the *Louisville* by Capt. Robert W. Curry. By taking advantage of seasonal high water, he successfully navigated from the Mississippi River to Franklin via Bayou Plaquemine and the Atchafalaya Basin. The navigation of this route allowed Curry to develop a virtual

monopoly over the Teche steamer trade between 1825 and 1830 (Conrad 1979a:213). Local newspapers touted this steamer as marking the beginning of an important era in the history of the region [*St. Mary and Franklin Banner-Tribune*, April 23, 1870, cited in Goodwin et al. 1985b:184-185].

During the early-nineteenth century, steamboats utilized inland routes between the Teche region and New Orleans, traveling from the Mississippi River through Bayou Plaquemine then through various waterways of the Atchafalaya Basin to Bayou Teche. During periods of low water in Bayou Plaquemine, steamers could carry commerce through the Gulf, entering the Teche through the Atchafalaya.

Most of the steamboats plying the waters of Bayou Teche and the other lesser streams of the study area prior to about 1840 were small, probably similar to, or even smaller, than those employed in the Red River trade as described by Norman (1942) and Pearson and Wells (1999). These vessels ranged in size from 100 to 120 ft long by 20 to 24 ft wide and with depths of 3 to 4 ft. Both sidewheelers and sternwheelers were used, but in the early years sidewheelers were most common. However, sternwheelers began to increase in popularity beginning in the mid-nineteenth century. Sternwheelers may have had an advantage on the small streams of the study area because of their ability to cross shallow water and travel on narrow streams. In addition, with the paddlewheel at the stern it was somewhat removed from the dangers of snags and logs which were numerous in the area.

Advertisements for steamboats in nineteenth-century newspapers often note that boats to the "Attakapas," the earlier name for the Teche region, were "light draught" and able to run during the low-water season. Typical are the following advertisements from the October 18, 1845, edition of *The Planters Banner*:

> New Orleans and Attakapas Regular Packet, The New, light draft and fast running, double engine steamer Judge McLean, M.W. Hinkle, Master, will run during the ensuing season as a regular weekly Packet between New Orleans and Attakapas. This boat is well adapted for the trade being of very light draft (only 26 inches light,) having fine accommodations and running fast. She stands as high in the Insurance offices as any boat. She will commence running, via the Atchafalaya about the 10th of November, if Plaquemine should not be open so soon.

> Summer Arrangement. Attakapas Packet, between New Orleans & St. Martinville. The Light Draught, Substantial Steamboat Waverly, J.V. Singer, Master, Will run as a regular packet, during the season, via the Plaquemine and Atchafalaya, leaving New Orleans every Sunday morning, at Ten o'clock, A.M., and St. Martinville every Tuesday, at One o'clock P.M., landing freight and passengers at all intermediate landings.... The Waverly being of light draft, will remain in the trade and be able to run the whole season, during low water. A share of patronage is expected.

As one of the advertisement notes, the *Judge McLean* would take the sea route from New Orleans, through the Gulf and up the Atchafalaya River, if necessary. As noted, many of these early steamers were fairly small and not adapted to travel in open Gulf waters, thus they preferred the inland routes across the basin. By the 1840s, however, steamers were commonly traveling to the Attakapas region by the sea route. For example, also included in the October 18, 1845, issue of *The Planters Banner* was the following advertisement for the steamer *Belle of Attakapas:*

> New Orleans and Attakapas Packet, The substantial and well known steamer Belle of Attakapas, Captain C. Johnson, having been thoroughly repaired, and refitted, will run, on the sea route as a regular packet throughout the season, between New Orleans and New Iberia, taking freight and passengers for all intermediate landings on the Teche, Atchafalaya & Bayou Boeuf.

Major ports along the Teche included Franklin and New Iberia. Steamboats on the Teche during the 1840s and 1850s included the *St. Helena*, the *Kentucky*, the *St. Mary*, the *Judge McLean*, and the *Billow* (Goodwin et al. 1985b:185). Huber (1959) provides a number of advertisements for steamboats running between New Orleans and the Bayou Teche area. In 1828, the steamer *Attakapas* "having fine accommodations" was noted as leaving for the Attakapas area (Huber 1959:7). An 1848 description of vessels traveling the Bayou Plaquemine route provides a sample of the watercraft plying these inland channels:

> Vessels from the north occasionally arrive, and flat boats, oyster boats and diverse other crafts, arriving without the warning of a bell or scape-pipe, all act their part in giving to these waters a business aspect. There is one flat-boat on whose long side you may read the name Atchafalaya, that is somewhat remarkable for a flat-boat. At a distance she looks like other boats of her species, but upon more careful examination you find that she has a sternwheel, and inside a steam engine, and when she is in motion she paddles and puffs with as much independence as a full grown steamer . . . Give us plenty of water in the Plaquemine, and steam boats plying between St. Martinville and New Orleans will be so numerous that one may, any day in the week, step aboard a fine boat that will land him safe in the city in about thirty hours. This brings New Orleans almost within hailing distance [*St. Mary and Franklin Banner-Tribune*, April 23, 1870, cited in Goodwin et al. 1985b:185-186].

Reduction of ocean-going commerce out of and into Bayou Teche began in 1857 with the completion of the New Orleans and Great Western Railroad between New Orleans and Brashear City. Although steamboat traffic above Franklin briefly increased after 1857, inland waterborne commerce later declined as the railroad expanded farther up the Teche during the 1870s (Goodwin et al. 1985b:186).

Although technically not part of the Bayou Teche system, Bayou Courtableau was connected to the Teche at Port Barre. The upper Teche was extremely shallow and could be navigated with ease only during high water (CE 1888:1372; 1881:1167; 1890:1516; 1895:1789). Although waterborne commerce certainly existed on Bayou Courtableau prior to 1812, very little historical information is available prior to the introduction of steamboats. The first steamboat arrived at what was known as Church Landing on Bayou Courtableau in 1832. Church Landing, later incorporated as the town of Washington, soon became one of the largest port communities in southwestern Louisiana. Steamboats traveled as far upstream as the junction of Bayous Cocodrie and Boeuf. Above that point, goods were commonly transferred to barges measuring 12 ft wide and 90 ft long. In 1862, typical export goods included cattle, hides, cotton, sugar, molasses, and lumber. Typical imports included primarily manufactured goods such as ceramics, glassware, silver, cloth, shoes, guns, hardware, liquor, flour and coffee (Goodwin et al. 1986:76-77). The difficulty of traveling between New Orleans and Washington is illustrated in the following 1844 account:

> It is notorious to everyone, that Opelousas in certain seasons, is almost entirely shut out from the world, and nearly inaccessible, either for business or pleasure. We were so unfortunate as to be absent from the Parish a few weeks since and in our return left New Orleans expecting to reach home in three or four days from the time we embarked. The sequel proved that the time required was exactly thirteen days . . .
>
> Ordinarily we could have left New York and reached the Old World in much less time. After leaving Orleans, we got along pretty well until we reached the mouth of the Red River, where the current runs with such velocity, and the water usually is so low, that it is impossible for boats to get up. Seven steamers lay within a half mile of each other at the same time — none of which could get through the current and mud, without the help of "hawsers," which were spliced together and cast a mile ahead, by which means, and all the steam that could be put on, the boats, one by one, pulled over by their windlasses. The current very often was so great as to break the lines, and then the boats were driven into the mud. Not one crossed without dragging. Having finally overcome this difficulty, and passed through the Atchafalaya without much trouble, we were brought up at the mouth of the Courtableau in no water, or next to it for navigable purposes, and were again forced to work through the mud with ropes and steam. After getting in, it was almost as bad to get up further. But by dint of perseverance, the boat was enabled to reach as high as the Wakshee. From thence to Washington, skiffs were our conveyances.
>
> No persons, unless on the boats, could conceive of the trouble and inconvenience of such travel. Luckily for us, our captain was a determined man, else we should have been dropped at the mouth of the Courtableau, as were some of our friends before us from another boat [Wenger 1974:36; cited in Goodwin et al. 1986:77-78].

Prior to the Civil War, steamboat commerce on Bayou Courtableau was quite substantial for an area so far inland. During this period:

> The Steamers *Opelousas* and *Anna* made weekly round trips between Washington and New

Orleans. Other packet boats operating on Bayou Courtableau during the 1850s included the *Elizabeth*, the *Little Tom*, the *Alice W. Glaze*, the *Mary Jane*, the *Sydonia*, the *Sarah Gordon*, and the *Red River*. A combined stage and steamboat route carried the mail and passengers between Donaldsonville and Washington. In 1853, mail arrived in Opelousas on Tuesdays, Thursdays, and Saturdays. Outgoing mail left every Wednesday and Friday [Goodwin et al. 1986:91].

Above Leonville, Bayou Teche forks into an east and west branch. The east branch is today known as Bayou Teche, but prior to 1890 it was known as the "Little Teche" (CE 1890:1516). The channel between Leonville and Port Barre, where it intersects Bayou Courtableau, is 19 mi (30.6 km) long. The west branch of Bayou Teche is today called Bayou Mariecrouquant or Little Teche. During flood stage barges sometimes traveled down the Little Teche from the Courtableau, picked up freight, then were poled or cordelled back up to the Courtableau where the cargo was transferred to steamboats (CE 1889:1516).

Bayou Fusilier represents one of the small tributaries at the upper end of the Teche. It connects the Teche (at the town of Arnaudville) to Bayou Barbeaux, a small tributary of the Vermilion River. Bayou Fusilier was not considered navigable in the first half of the nineteenth century (CE 1882:1419).

Prior to the establishment of Brashear City (present-day Morgan City), the town of Franklin on the lower Bayou Teche was the principal "deep water" port in the area. The town was a considerable distance from the Gulf; however, deep-water access could be obtained by the Atchafalaya River and the lower stretches of Bayou Teche. In addition to steamboats, ocean-going sailing ships called at Franklin from all over the world to unload manufactured goods and foodstuffs and to take aboard the sugar, cotton, lumber, and other products of the region. For example, on December 6, 1845, the Franklin newspaper *The Planters Banner and Louisiana Agriculturist* noted several vessels that had arrived and departed during the week. The list consisted of the following:

Arrived

Schooner, *Gen. Patterson*, Captain Wells, Philadelphia
Schooner, *Florence*, Captain Smith (no port of origin)
Brig, *Abby Amelia*, Captain Colburn, Kingston, Jamaica
Schooner, *Alido*, Captain Usher, Breston, R. I.

Departed

Schooner, *Gen. Clinch*, Captain Ratcliff, Richmond, Virginia
Schooner, *Patriot*, Captain Purchase, New York
Brig, *Abby Amelia*, Captain Colburn, New York
Schooner, *Alido*, Captain Usher, Charleston

These sailing vessels typified those coming into the study area from the Gulf of Mexico. Most of these were confined to the lower reaches of the Atchafalaya River and Bayou Teche, in part because of their deep drafts but also because of the difficulties of sailing on the sinuous and often fast-running steams of the study area.

Specific information on the nature of cross-basin steamboat commerce can be found in nineteenth century records of commercial enterprises located in the Bayou Plaquemine area, as well as along Bayou Teche and Bayou Courtableau. For example, the register of the steamer *Trader,* and bills of lading for Iberville Parish merchant John L. Pointer, offer information on the nature of the steamboat trade between Plaquemine and the Bayou Teche region during the 1840s (Louisiana and Lower Mississippi Valley Collections [hereinafter cited LLMVC], John Pointer Papers; S. B. *Trader* Register, n.d.). Between 1841 and 1843, the *Trader* made frequent trips between Bayou Teche and Plaquemine. The specific towns visited included Franklin, New Iberia, St. Martinville, Opelousas, Indian Village (along Bayou Plaquemine), and Plaquemine. Records for two typical trips from Plaquemine to Grosse Tete with freight and passengers are presented in Table 3-1.

Although freight items for the trips to and from the Bayou Teche region are not itemized within the *Trader* register, it can be assumed that the Bayou Teche cargoes were similar to those of other portions of the study area where the economy was similar. Manufactured goods and supplies would have been shipped into the Teche region through Plaquemine, while agricultural products, such as cotton and sugar, would have been transported on the return trips (Figure 3-4). Similar cargoes were carried by other vessels employed by John Pointer of Indian Village (Plaquemine). Between 1840 and 1842, Pointer shipped goods to the Teche region (Opelousas, Attakapas, Washington, St. Martinville) via several steamers, including

Table 3-1. Record of Trips 36 and 39 Made In 1841 By The Steamboat *Trader*.

Trip No. 36 To Grosse Tete. Feb. 22, 1841

(Name)	(No.)	(Item)	(Cost)
Isaac Erwin			
	1	Hogshead sugar	
	14	Barrels sundrys	
	3	Logs	
	10	Plows	
	11	Boxes	
	4	Iron ploughs	
		Madam Passage	($)24
		Servant Passage	16
Miles Briston			
	7	Barrels sundrys	4
Hotard			
	3	Boxes	2
	3	Packages	2
	1	Barrel	4
	1	Baroushe	24
	2	Horses	24
		Passage	24
Harrison			
	1	Sack salt	4
Dickinson			
	1	Bale bagging	4
Leftwich			
		Mad Turner Passage	24
M Herrington			
	1	Pair boats	2
	6	Pieces of bulk pork	
Daniel Mills			
	1	Barrel	4
James Grice			
	1	Book case	
	1	Table	
		Passage	24
P Guiliseau			
	2	Barrels lime	4

Trip No. 39 to Grosse Tete. Feb. 25, 1841

(Name)	(No.)	(Item)	(Cost)
Batey			
		Passage for two	24
	3	Kegs of nails	2
	1	Package	2
T. Lelland			
	1/2	Box tobacco	2
	2	Buckets	2
	1	Keg of nails	2
	1	Keg of tar(?)	2
	1	Bag salt	4
	1	Grind stone	2
	11	Pots	1
	1	Pair of (?) irons	2
	2	Ploughs	3
	1	Cross cut saw	2
	1	Bake oven	2
	1	Bundle ax handles	2
	1	Barrel of flour	5
	6	Boxes measuring 110 ft 5 c per foot	
C A Edward			
	6	Barrels of pork	4
	5	Ploughs	3
Du Rose			
	1	Clock	4
	1	Barrel	4
	1	Do hams	4
	1	Do pork	4
	1	Plough	3
	2	Bundle of trees	4
	1	Bundle of hams	2
	1	Barrel	4
James Lee			
	4	Ploughs	3
	1	Barrel	5
	1	Box sundrys	4
Du Duncan			
		Passage for three	24
C H Dickinson			
		Passage	24
	1	Plough up and down	4
A J Leftwich			
		Passage his sister	24
T Weatherby			
		Passage up & down	24
		Balance due to date	2
C H Dickinson			
		Freight on cotton 5 bales	12
C Breaux			
		Freight on cotton 7 bales	12
M Smith			
		Freight on cotton 129 bales	12

(source: Steamboat *Trader* register, Louisiana and Lower Mississippi Valley Collections, Louisiana State University Libraries)

the *Alexander Gordon, William Woods*, and the *Panola*, in addition to the previously mentioned *Trader*. Trips to New Orleans usually involved cargoes of cotton and sugar, and the New Orleans-bound vessels included the steamers *Patrick Henry, Panola, Robert Fulton, Pensian* (?), *Teche, Pennolux* (?), *Angora*, and *Hannibal* (LLMVC, John Pointer Papers). The departure schedule indicates that vessels made round trips from Plaquemine to the upper Bayou Teche every 2 or 3 days.

Most of these vessels also carried passengers, although specific information on passenger travel is scarce. The accommodations on boats varied considerably, and steamboat travel was not without its hazards, as boats sank, exploded, or burned. Still, it became a standard way of life to travel by boat, particularly in the study area where overland roads were few. The larger boats operating on the Mississippi River often provided luxurious accommodations and sumptuous meals; but the smaller boats traveling over relatively short distances in the study area would have been relatively plain and simple by comparison. Some accounts indicate that travel on some boats was less than desirable. In 1843, John James Audubon, traveling on a steamboat on the Mississippi River described it as "the very filthiest of all filthy old rat-traps I ever traveled in" (Donovan 1966:108-109). Another traveler described his boat as "a crazy, dirty little craft . . . furnished with scanty and dirty bedding . . . the boat was crowded with passengers and almost sinking with freight, wet, dirty and uncomfortable; the food was detestable . . ." (Donovan 1966:108-109).

In addition to agricultural products and passengers, livestock became an important commodity in the steamboat traffic in the Atchafalaya Basin. Large numbers of cattle were raised in the prairie lands of western Louisiana, driven to points on the western side of the basin and transported across to Bayou Plaquemine (Duperier 1979:59-60, in Gibson1982:117). Additionally, cattle were driven to Berwick, carried by ferry across Berwick Bay to Brashear City (Morgan City), and then driven along elevated natural ridges toward New Orleans.

The boats employed by John Pointer were fairly typical of those used in the study area throughout much of the steamboat period. The *Alexander Gordon* was a small steamboat of 65 tons, measuring 76 ft, 5 in long and 17 ft wide and with a 5-ft-5-in hold. This vessel had two boilers and one chimney. The owners were Louis and Felix Forstall of New Orleans (WPA 1942:3:6). The *Panola* was a larger vessel, having a burden of 136 tons and measuring 123 ft long and 24 ft wide. Her hold was 5 ft deep. The *Panola* was owned by Willis Main and George Haygood of New Orleans (WPA 1942:3:167). The *Selma* was among the largest vessel used in the cross-basin trade. Built at Pittsburgh, Pennsylvania, in 1867, her burden was 600 tons and she measured 180 ft long by 37.5 ft wide, with a 7-ft hold. This vessel, like the *J.G. Blackford*, was owned and piloted by Charles C. Pickett of New Orleans (WPA 1942:6:251-252). The *Lessie Taylor*, built in 1870 at the famous Howard Ship Yard in Jeffersonville, Indiana, was a 435-ton sternwheeler, measuring 157 ft long, 38 ft wide and with a 7-ft hold. The *J.G. Blackford* was a 439-ton sternwheeler, 164 ft long and 32 ft wide with a 5-ft hold. Both the *Lessie Taylor* and *J.G. Blackford* were enrolled at New Orleans (WPA 1942:6:144,167) and were typical of the steamers involved in the "New Orleans-Atchafalaya" trade (Figure 3-5). In 1878, the *Lessie Taylor* was sunk by a snag at Glover's Point on the Atchafalaya River. Six persons were lost. The fate of this boat illustrates the hazards of river travel in the nineteenth century.

Another family that operated steamboats in the study area were the Offit brothers, William and Nathaniel. In the mid-nineteenth century Nathaniel Offit had a sawmill along Grand River near its confluence with Tensas Bayou (Castille et al. 1990:36). This location was along one of the area's principal steamboat routes. The details of Offit's sawmill operations remain unknown, but there are numerous references to his and his brother's commercial boating ventures. One document records a rental charge of $75.00 owed to O.S. Hinckley and James Powers, businessmen from Washington, Louisiana, who leased the flatboat *Robt. E. Lee* to Nathaniel Offit during the 1860s (LLMVC, Hinckley Papers Cashbook No. 7, n.d.). This is one of the few references found to a named flatboat in the study area. This may indicate the boat was intended for an extended period of use, and not the one-trip life common for flatboats on the Mississippi River. One of the earliest steamboats owned by the Offit brothers was the sidewheeler *Rio Grande*, built at Jeffersonville, Indiana, in 1846. In 1850, the brothers sold the *Rio Grande* to Captain Oramel Hinckley and James Johnston (Way 1994:394). Between 1858 and 1860, Nathaniel Offit was part owner (with George Ulrick, O. Hinckley and Gustave Louaillier) of the steamer *Aline*, which traveled between Washington and New Orleans and on the Red River. The *Aline*, a sternwheeler

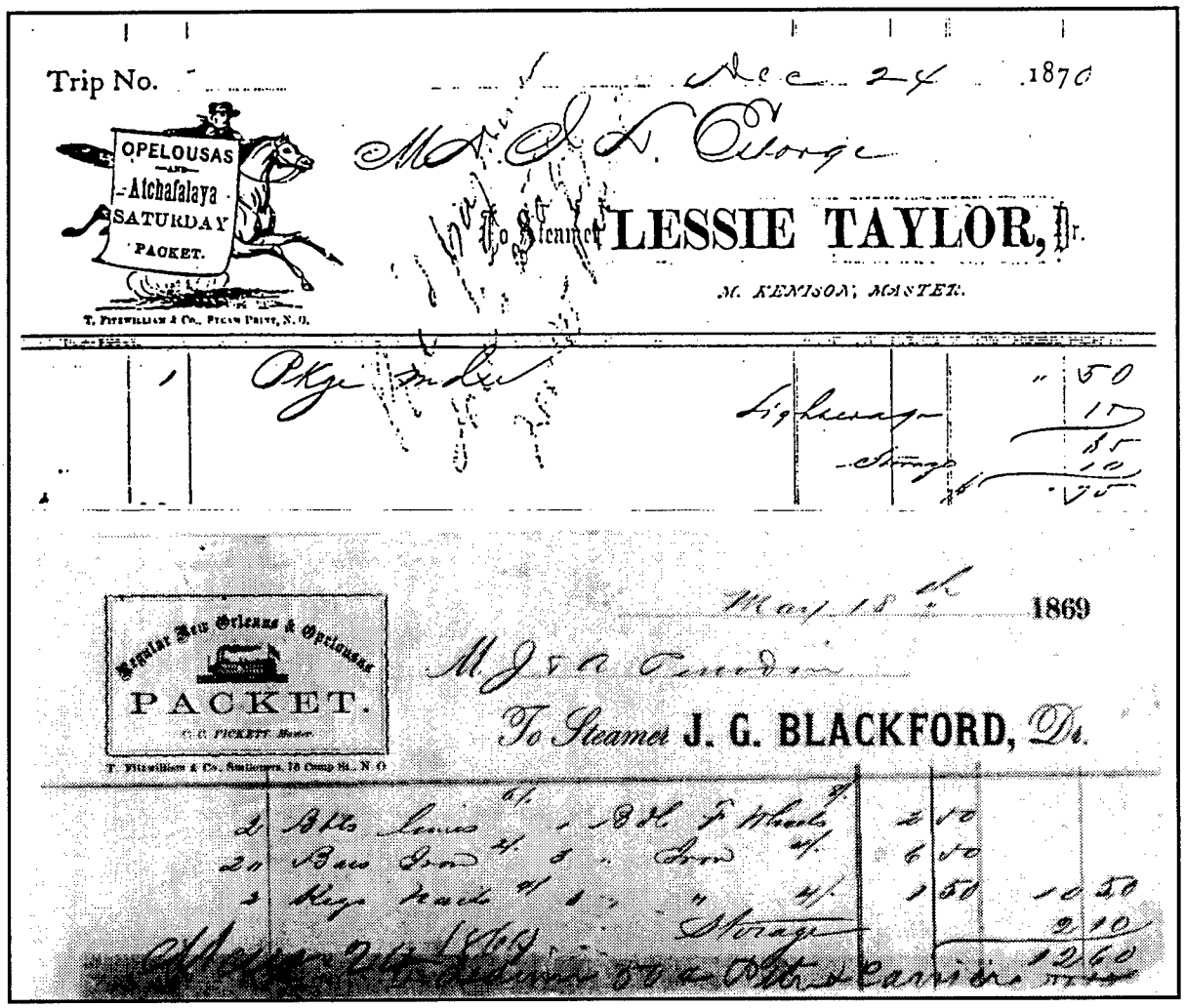


Figure 3-5. Waybills for the steamers *Lessie Taylor* and *J.G. Blackford* (source: LLMVC and private collections).

built by the Howard Ship Yard at Jeffersonville, Indiana, in 1858, had a burden of 175 tons, measured 125 ft long by 30 ft wide, and had a depth of hold of 5 ft 6 in (Way 1994:13; WPA 1942:5:9). This boat was constructed specifically for the Red River and Atchafalaya trades at a cost of $3,350 (Fishbaugh 1970:195). The *Aline* remained in operation during the Civil War, carrying material for the Confederacy (Way 1994:13).

The Offit family was involved in the operation of several other boats in the cross-basin trade. William and Nathaniel Offit, reported to be residents of Washington, owned the sternwheeler *Elmira* in 1858. The 139-ton *Elmira*, built at Pittsburgh in 1858, measured 125 ft long by 27 ft wide and had a 4-ft-6-in hold (WPA 1942:5:80). An 1858 advertisement in a New Orleans newspaper noted:

> FOR VERMILLION, The light draught steamer ELMIRA, J.J. Smith, master, will leave as above, taking freight for Vermillion, Abbeville, Perry's Bridge, Berwick's Bay, Pattersonville, and landings on the route as high as the water will permit [Huber 1959:22].

The *Elmira* went to Confederate registry in 1861 and was captured by Union naval forces in 1863 (Way 1994:147). The sternwheeler *Opelousas* was owned in part by the firm of Offit Brothers of St. Landry Parish, between 1853 and 1857. Oramel Hinckley of St. Landry Parish served as the boat's master in

1853 and in 1857 William Offit was master. This steamer, built at New Albany, Indiana, in 1852, measured 102 ft long by 22 ft wide and had a 4-ft-6-in hold (WPA 1942:5:198). The *Opelousas* ultimately went to Texas where, on November 12, 1857, she collided with another steamer near Galveston and sank with the loss of eighteen lives, one of the worst steamboat disasters on Galveston Bay (Way 1994:356).

Between 1851 and 1853 the Offit Brothers firm also owned the sternwheeler *Ophelia*, a 289-ton vessel registered in New Orleans. John H. Gordon of St. Landry Parish was part-owner of both the *Opelousas* and the *Ophelia* and served as master of the latter boat. William Offit was, also, part-owner of the sternwheeler *Anna Perrett* of Washington, Louisiana. Other owners included Washington residents O. Hinckley and G.S. Louaillier. This 173-ton vessel measured 130 ft long by 32 ft wide and had a 4-ft-6-in hold (WPA 1942:5:16). Between 1859 and 1860, Washington residents W. Offit, G. Ulrick, O. Hinckley and G. Louaillier were owners of the 253-ton, sidewheel steamboat *William Burton* (or *W. Burton*). This steamer may have been working out of the town of Franklin on Bayou Teche. The *William Burton* was 151 ft long, 29 ft wide and had a 5-ft-6-in-deep hold (WPA 1942:5:269). The *Burton* ran in the New Orleans-Opelousas-Atchafalaya trade until her capture by the United States during the Civil War. Way (1994:487) reports that the *William Burton* was taken over by the United States Quartermaster Department in 1862, however, the steamer is not included in the list of Army vessels compiled by Gibson and Gibson (1995).

In addition to the vessels partially owned by the Offit brothers, prominent Atchafalaya and Red River steamboat captain Oramel Hinckley piloted the steamboats *Alice W. Glaze* (161 tons) and *Nina Simmes* (327-ton sidewheeler), which seem to have been used in the cross-basin trade between New Orleans and Washington (WPA 1942:5:191). The Louisiana State Archives holds correspondence between Captain Hinckley and a boat yard in New Albany, Indiana. On July 21, 1852 John Gordon wrote Hinckley about the progress of building a boat, "The Brat [Boat ?] is now almost ready for planking." On August 18, 1852, in order to explain delays in finishing the boat, Gordon wrote Hinckley that the "foundry have [*sic*] so much work on hand" (Louisiana State Archives [hereinafter cited LSA], Arthur L. Hinckley, Jr. Papers; PP8.2, n.d.). Unfortunately, the extant correspondence does not name this boat, but it apparently was being constructed for the local trade. Captain Hinckley was involved with several other boats, including the *Irene*, advertised as a "Regular New Orleans and Opelousas Weekly Packet" in 1866 (Huber 1959:34). In the Hinckley papers at the Louisiana State Archives is a large collection of individual account books for the *Irene* that provide detailed information on the steamer's activities, including who booked passage on the vessel, where they landed and the amount they paid for travel. The listing of ports and landings furnishes specific information on place names of property owners and data on routes between towns. Included in this collection are a number of waybills from several merchants that provide a picture of the types of cargo carried aboard the *Irene*. For example, there are bills for soap from Strohnaier & Grennon of New Orleans; oysters from Wm. H. Morgan and from Jos. Planellas on Poydras Street; ice from the Ice Consumers Association of New Orleans at No. 17 Canal Street; country produce - eggs, chickens and moss from E. Montague, Jr., Commission Merchant at 21 St. Louis Street; groceries from J.W. Goslee at No. 7 Front Street and from I.W. Arthur Stone & Co. at the corner of Tchoupitoulas and Gravier Streets; and wines and liquors from Collie & Winckelmann at 106 Poydras Street of New Orleans (LSA PP8.3, n.d.).

Other pre-Civil War steamers traveling the cross-basin routes and the sea route to the region included the *St. Mary, Judge McLean, Nina Simmes, St. Helena, Frankland, Belle-Isle, Sarank, Billow, Waverly, Oreline, Correo, Mondiana, Banner of Attakapas, Grey Eagle, John Morrisett, Star, Bayou Boeuf, Vesta,* and *Houma* (*The Planters Banner*, various years). Table 3-2 provides a listing of boats known to have been operating on the waterways of the study area during the period from about 1817 to the early years of the twentieth century. This listing is derived from the various sources examined in this study and is not in any sense considered to be complete. For one, the list is of commercial vessels only. Additionally, most of the Civil War era boats are not listed; historical information on them is readily available elsewhere. The list is heavily weighted toward steamboats that operated on the areas' inland waterways; only a few sailing and steam vessels traveling to and from the Gulf of Mexico are included. This is simply because of the nature of the sources utilized, which tend to concentrate on inland river steamers. Also, the number of commercial vessels that have used the study area in very recent times, mainly towboats, barges, and fishing vessels, are so numerous that a listing would be difficult to obtain. The objective of the list is to provide basic information on the types

Table 3-2. Example of Vessels Operating in the Study Area From 1817 to Circa 1900.

Vessel Name	Vessel Type*	Where Built	Date Built	Tonnage	Length (ft)	Breadth (ft)	Draft (ft)	Loss If In Study Area	Date of Loss
A. Durio	stw	New Iberia, LA	1881		66	18	3		
A. Fuselier	ssw	Franklin, LA	1851	357.8	152	32	8		
Adelph	ssw	Opelousas Co., LA	1832	27.4	27	11.8	3.1		
Adventurer	keelboat	Ohio	1817	20.1	69.8	11	2.8		
Agnes	stw	Barataria, LA	1867	37.2	88	13.5	4		
Alexander Gordon	stb	Cincinnati	1837	65.2	76.4	17.3	5.4		
Alexander Porter	stb	Louisville, KY	1839	156.3	137	23	5	Snagged on Bayou Plaquemine	
Alice W. Glaze	stw	Louisville	1853	161.1	108	30.9	5.5		
Aline	stw	Jeffersonville, IN	1858	175.4	119	30	5.5		
Amy Hewes	stw	Franklin, LA	1903		115	25	3.2		
Anna	ssw	New Albany, IN	1849	83.9	99.5	19.8	7.6		
Anna	ssw	Elizabeth, PA	1849	156.9	150	25	4.5	Snagged and lost "Atchafalaya Bayou, LA,"	Sept 3, 1852
Anna Perrett	stw	Jeffersonville, IN	1857	172.8	130	32	4.5		
Annie Wagley (Carrabasset)	ssw/stw	Louisville, KY	1863	202	152.7	31	4.6		
Any One	ssw	New Orleans, LA	1863	79.5	17.5	3		Foundered, Morgan City	Aug. 20, 1869
Aransas	prop steamship	Wilmington, DE	1877	1157					
Arthur	suction dredge								
Assumption	stw	Jeffersonville, IN	1875		151	35.8	6.5		
Atchafalaya	stw	Franklin, LA	1848	60					
Banner of Attakapas	ssw	Lake Chicot Pass, LA	1848	208					
Bayou Boeuf	stw	Bayou Boeuf, LA	1847	104.4	117	22	4		
Belle Isle	ssw	Cincinnati, OH	1846	219.7	156.1	26.7	5.6		
Bertha	stw	Louisville, KY	1870	253.1	135.6	32	4.9		
Bertrand	stb	Wheeling, VA(WVA)	1846	148.2	164	24	3.9	Snagged and lost on Bayou Sorrel	Jan. 11, 1850
Betsy Ann	stw	Dubuque, IA	1899		165	33	5.5		
Big Sunflower	stw	Jeffersonville, IN	1869		125	28	4		
Bois d"Arc	stb	Louisville, KY	1843	182	136	26	5.5	Snagged on Bayou Plaquemine	Dec. 21, 1847
Bradish Johnson	ssw	Jeffersonville, IN	1869	121.6	33.6	6			
Buck	keelboat	Pittsburgh, PA	1818	32.8	99	14.3	2.4		
Buckeye	stb	Cincinnati, OH	1837	170	146	21	6	Collided at Patterson, "Atchafalaya, LA"	Mar. 1, 1844
Caroline	stb	Pittsburgh, PA	1828	78				Snagged "Plaquemine, LA"	1834
Carrie B. Schwing	stw	Plaquemine, LA	1912		100.7	24	3.8		
Ceres	ssw	Louisville, KY	1853	217.8	166	27.6	5		
Cinderella	stb	Cincinnati, OH	1837	125.2	131	20	5	Snagged in Bayou Plaquemine	Mar. 28, 1841
Clinton	ssw steamship	Wilmington, DE	1863	721.5	222	32	10		
Constitution	keelboat	Ohio River	1818	32	96	13.4	2.8		
Correo	ssw	New Albany, IN	1847	89.5	103	20.7	4.7		
Crescent	ssw steamship	Wilmington, DE	1863	1115.2	207.4	34.5	17.8		
Cricket	stw	Cincinnati, OH	1860	67				Scuttled on Bayou Teche	Apr. 14, 1863
Danae	keelboat	Tennessee	1818	38.5	94	14.3	3		
Danton	stw	Berwick, LA	1879		73.8	20.6	2.8		
Danube	stw	Cincinnati, OH	1877		175	33.8	5.1		
De De	stw	Algiers, LA	1856	80.9	118	20.9	3.6	Snagged on Bayou Black	Mar. 27, 1858
Delatour	dredge								
Diana	ssw	Brownsville, PA	1858	239	165	26.3	5.8	Burned on Bayou Teche	Apr. 12, 1863
Dixie	stw	Houma, LA	1915		131	24.2	3.4		
Dr. Batey	ssw	Louisville, KY	1850	281	171	28.7	6		
Duncan F. Kenner	ssw	Jeffersonville, IN	1859	493	215	37	8		
E.H. Barmore	stw ferry	Jeffersonville, IN	1879		135.7	30.1	5.4	Bayou Pigeon	before 1894
Eliza	keelboat	Davison Co., TN	1816	31.3	90.2	12.3	2.9		
Eliza	keelboat	Louisville, KY	1818	28.6	96.4	30.2	2.3		
Elizabeth	ssw	Marietta, OH	1842	93.5	85	22	4.8		

(continued)

Table 3-2. Continued.

Vessel Name	Vessel Type*	Where Built	Date Built	Tonnage	Length (ft)	Breadth (ft)	Draft (ft)	Loss If In Study Area	Date of Loss
Elmira	stw	Pittsburgh, PA	1858	139.5	125	27	4.5		
Empire Parish	ssw	New Albany, IN	1859	279.8	170	32	6		
Era No. 10	stw	Madison, IN	1868	176.9	136	30.8	5		
Esperance	keelboat	Ohio River	1818	24.8	86.4	12.7	2.4		
Excel	ssw	Brownsville, PA	1839	40.3	97	14	3		
Exchange	stw	Brownsville, PA	1852	128					
F.M. Owens	stw	Helena, AK	1910		155	35.3	5	Grand River, LA	1915
Fanchon	stw	Brownsville, PA	1875		174	35	2.4		
Fanny and Louisa	keelboat	Pittsburgh, PA	1817	40.5	102.2	15	2.8		
Favorite	keelboat	Cincinnati, OH	1818	21.5	88.2	12.7	2		
G. W. Anderson	stw	Franklin, LA	1881		81	22	3	Grand River	
Galenian (Galenean)	ssw	Pittsburgh, PA	1834	107 or 133	128	18	5	Burned in Bayou Plaquemine	Mar. 16, 1839
Galveston	ssw steamship	Brooklyn,NY	1857	945.5	233.2	34.2	12.2		
Golden Era	stw	Cincinnati, OH	1866	359.2	155.7	32.4	4.9		
Gossamer	stw	Pittsburgh, PA	1863	144	122.5	23.1	3.3	Scuttled on Bayou Teche	Apr. 13, 1863
Grand	stw	Grand Rapids, MI	1905		136	32.2	5	Burned on Bayou Teche	May 17 1921
Grey Eagle	ssw	Cincinnati, OH	1847	159.8	146	23	5	Snagged and lost on Grand River	Jan. 18, 1850
Gross Tete	sw	New Albany, IN	1858	399	180	34	7		
H.J. Dickey	stw	Memphis, TN	1881		169.4	32.3	5.8		
Hannibal	ssw	Belle Vernon, PA	1856	497	226	36	7		
Harlan	ssw steamship	Wilmington, DE	1866	1163	219.9	34	16.6		
Harry Bishop	propellor tug	New Albany, IN	1882	16.41	55	9	3		
Hattie Bliss	propeller	Harmar, OH	1883		85	14	3		
Henderson	ssw	Cincinatti, OH	1818	123.2	113.5	18.5	6.2		
Houma	stw	New Albany, IN	1848	55	97	26	6		
Houma	stw	Madisonville, LA	1906		136	23.8	4.8		
Huron	stw	Christler's Landing, PA	1851	168				Snagged and lost on Atchafalaya River	Feb. 23, 1855
Hyacinth	stw	Patterson, LA	1904		102.5	28	2.5		
I.C. Harris	ssw steamship	Wilmington, DE	1865	994.5	219.9	33.1	16.6		
Irene	stw	Louisville, KY	1864	211	155.9	31.8	4.6		
Isabel	stw	New Orleans, LA	1876	136					
J. D. Hinde	stw	Portsmouth, OH	1863	174.2	126.9	22.8	4.3		
J. E. Trudeau	stw	Jeffersonville, IN	1889	242	160	30	4.2	Burned on Belle River	1921
J. Morrisett	ssw	Jeffersonville, IN	1849	391	168.7	31	8		
J.G. Blackford	stw	Cincinnati, OH	1864	439.5	164	32	5		
Jack Downing	sloop	Franklin, LA	?	7.6					
James Lawrence	schooner	Tappan, NY	1813	56.8	61.1	20	5.5		
John M. Chambers	stw	Mound City, IL	1875		174	32	4.7	Snagged and burned on Bayou Teche	July 24, 1884
Josephine	ssw steamship	Wilmington, DE	1867	1282.5	236.8	24.3	18		
Kate Dixson	stw	Pittsburgh, PA	1873	96					
Lafourche	ssw	Jeffesonville, IN	1859	334.7	184.6	34.6	7.4		
Lafourche	stw	Jeffesonville, IN	1888		166	38	6.5		
Laura	ssw steamship	Wilmington, DE	1866	1098.3	232.4	35.4	11.4		
Lessie Taylor	stw	Jeffersonville, IN	1870	435	157	37.8	7	Lost mouth of Atchafalaya River	Feb. 3, 1878
Little Rufus	stw	Stillwater, MN	1903		130.9	29.5	5.5		
Little Sallie	stw	Jeffersonville, IN	1860	71	98	23	3.5		
Little Tom	stw	Opelousas, LA		62	91	7.1	4.2		
Live Oak	ssw	Paducah, KY	1863	365	176.4	37.2	6		
Lively	keelboat	Ohio River	1818	30.7	96	13.3	2.5		
Livingston	sw ferry				180	40	9		

(continued)

Table 3-2. Continued.

Vessel Name	Vessel Type*	Where Built	Date Built	Tonnage	Length (ft)	Breadth (ft)	Draft (ft)	Loss If In Study Area	Date of Loss
Lizzie Haas	schooner	Madisonville, LA	1882	26.6	59.2	21.5	4.3	Foundered, Wine Island	1902
Lizzie Hopkins	stw	Cincinnati	1867	453	158.8	35.8	5.8		
Louise	ssw steamship	Wilmington, DE	1866	1023.2	231.7	33.3	8.8		
Louisianais	ssw	New Orleans, LA	1818	103	84.8	20.5	6.6		
Louisville	ssw	Louisville, KY	1824	48.26					
Mabel Comeaux	stw	Jeffersonville, IN	1891		178	36	6.5		
Maria	keelboat	Pittsburgh, PA	1816	29.5	85	12	3		
Martha	stb	Madison, IN	1875	175					
Mary	keelboat	Bayou Fusillier, LA	1819	35.1	58.8	17.2	4		
Mary	ssw steamship	Wilmington, DL	1866	1096.5	234.1	33.2	9.6		
Mary F. Golden	stw	Millwood, WV	1896		86.2	16.2	3.6	Burned on Bayou Teche	Jan. 28, 1908
Mary T. (J. A. Cotton)	ssw	Jeffersonville, IN	1860	372	185	34	8	Burned on Bayou Teche	Jan. 14, 1863
Mary V. Alice	stw	Berwick, LA	1882	38.1	77	17	3		
Merchant	ssw	Baltimore, MD	1835	303	151.7	25.5	8.3	Foundered, West Timbalier Island	1842
Minnie	stw	California, PA	1869	40	83.2	18	3.3		
Minnie Avery	stw	California, Pa.	1869	92.6	118.4	26.4	3.3		
Mink	stw	Pittsburgh, PA	1865	165	125	20.5		Burned on Bayou Teche	Dec. 1, 1878
Mondiana	ssw	St. Louis, MO	1847	152	154	23	4.5		
Monticello	ssw	Pipe Creek, OH	1829	94.5	113.3	18.5	4.8	Snagged on Bayou Plaquemine	Mar. 29, 1833
Morgan	ssw steamship	Wilmington, DE	1865	994.3	219.9	33.1	16.6		
Music	ssw	Jeffersonville, IN	1857	330	175	32.3	6.2		
Nancy	keelboat	Bayou Fusillier, LA	1818	29.4	56.4	16.3	3.7		
Naniope	ssw	Louisville, KY	1850	114.2	120.8	21.8	4	Snagged on Atchafalaya River	Sep. 15, 1852
New Iberia	stw	Pittsburgh, PA	1871		200	33	5.4		
News Boy	stw	Brownsville, PA	1859	115	133	27.3	3.4	Scuttled on Bayou Teche	April 14, 1863
Nina Simmes	ssw	New Albany, IN	1860	327	177	33	6		
Numa	keelboat	Ohio River	1818	23.1	87.2	12.8	2.2		
Ocean	ssw	Bayou Sorrell, LA	1834	177.8	108.5	27.1	6.7		
Opelousas	ssw	New Albany, IN	1852	113	102	22	4.5	Collided on Atchafalaya River	Nov. 15, 1857
Ophelia	ssw	New Albany, IN	1850	289.1	165.3	28.5	6.5		
Osprey	stw	Franklin, LA	1855	110	115	24	4.3		
Panola	stb	Cincinnati, OH	1839	136.4	123	24	5	Snagged on Bayou Pigeon	1842
Patrick Henry	stb	Cincinnati, OH	1840	161.6	144	21	5.7		
Peerless	stw	California, PA	1865	275	157	30	4		
Plough Boy	keelboat	Ohio River	1818	20.2	80.7	12.1	2.2		
Ploughboy	ssw	Louisville, KY	1834	81.5	186	16.1	5	Exploded, Plaquemine-St. Martinville	1839
Queen of the West	ssw	Cincinnati, OH	1854	406	181	36	6	Fired upon and sunk on Grand Lake	Mar. 14, 1863
Rachel	keelboat	Wheeling, WV	1814	27.9	86.2	12.5	2.7		
Ramos	stw	Ramos, LA	1896		97.5	22.5	3.5		
Red River	ssw	Harmar, OH	1850	276	174	29	6.2		
Rio Grande	ssw	Jeffersonville, IN	1846	166	149.8	24.5	4.8		
Rob Roy	stw	Madison, IN	1861	148	153.3	22.6	5.4		
Robert Fulton	ssw	California, PA	1860	158	137	29	4.3		
Ruth	stw	Freedom, PA	1870		140	35	5		
S.F. Archer (S.T. Archer)	ssw	New Albany, IN	1854	79.5	100.7	17.7	4.8		
Sadie Downman (J.A. Breaux)	stw	New Iberia, LA	1901?		110	24	3	Burned at Houma	15-Jun-13
Sandy No. 2	stb	New Albany, IN	1873	266					
Sarah Gordon	ssw	New Albany, IN	1850	150	135.1	22.3	5.2		
Sarank	ssw	Elizabethtown, PA	1846	198					
Scioto	stw	Portsmouth, OH	1863	54	110	16	3		

(continued)

Table 3-2. Concluded..

Vessel Name	Vessel Type*	Where Built	Date Built	Tonnage	Length (ft)	Breadth (ft)	Draft (ft)	Loss If In Study Area	Date of Loss
Scorpion	keelboat	Bayou Teche, LA	1816	20.4	58	12.1	3.2		
Selma	ssw	Pittsburgh, PA	1867	600.5	180	37.5	7		
Semaphore	ssw	Opelousas, LA	1835	106.9	103.7	19.1	5		
Silver Heels	ssw	Jeffersonville, IN	1857	267	187	29	6		
Sonora	stw	Wheeling, WV	1865	229	139	25.9	3.3	Snagged and lost on Atchafalaya River	Nov. 18, 1865
St. Helena	ssw	Elizabeth, PA	1846	124	143	22	4.1		
St. Mary	ssw	Cincinnati, OH	1844	183	153	24	5.2		
Stella Wilds	stw	Brownsville, PA	1886	289	156.6	30.5	4.6		
Sultan	ssw	Cincinnati, OH	1845	125	124	21	5	Snagged and lost on Atchafalaya River	Oct. 25, 1847
Sunbeam	stw	Cincinnati, OH	1857	167					
Swan	stb	Cincinnati, OH	1836	112.6	128	19.5	5	Foundered, Lake Chicot	April 4, 1838
Swift Sure	keelboat	Cumberland River, TN	1819	31.9	91.8	13.2	2.8		
Sydonia	ssw	Cincinnati, OH	1851	235	162.5	28	5.5		
Tahlequah	stw	Pittsburgh	1866	338	149	31	5		
Teche	stw	Jeffersonville, IN	1886		190	38	5.5		
Teche		New Orleans, LA	1820	295.6	126.4	25	10		
Teche (former Tom Sugg/Tensas	ssw	Cincinnati, OH	1860	64.5	95.6	22.4	3.6	Foundered on Bayou Teche	1868
Thistle	schooner	Mobile, AL	1864	52.3	73.1	21.2	5.7	Foundered, Timbalier Island	Oct. 25, 1877
Trader	ssw	Louisville, KY	1851	40					
Trenton	ssw	Monongahela, PA	1851	144	122.3	24	5.3		
Una	ssw	Portland, KY	1863	160.5	131.9	23.2	4.3	Stranded and sank on Atchafalaya River	Aug. 12, 1867
Utina	steam freighter	Morgan City, LA	1919	2551	267.3	46	23.6		
Vesta	ssw	New Albany, IN	1845	92	117	21	4		
Volcano	ssw	new Albany, IN	1818	217.2					
Warren	stw	Cincinnati, OH	1882		184	37.6	6.5		
Watchman	ssw	Brownsville, PA	1831	118.2	112.3	19.1	5.8	Snagged on Bayou Plaquemine	Jul. 16, 1836
Water Witch	stb	nashville, TN	1831	120				Snagged near Plaquemine	1833
Whitney	ssw steamship	Wilmington, DE	1871	1338					
William Burton	ssw	New Albany, IN	1857	253.5	151	29	5.5		
William G. Hewes	ssw steamship	Wilmington, DE	1860	1117.6	233.3	33.1	18		
Xenophen	keelboat	Pittsburgh, PA	1819	33.4	87.2	15.3	2.7		
Yazoo	stw	Jeffersonville, IN	1873						
Yellow Jacket	keelboat	St. Louis, MO	1818	29	89.5	12.2	2.8		
Zulma	sloop	Bayou Black, LA	1835	71.8	57.5	17.9	8.1		
16 SMY 61, Watercraft 1	coal barge		19th century		117	26	3	Abandoned on Bayou Shaffer	
16 SMY 61, Watercraft 2	sloop/lugger		19th century		46	16	3	Abondoned on Bayou Shaffer	

* ssw=sidewheel steamboat; stw=sternwheel steamboat ; stb=steamboat

of commercial vessels used in the study area during the historic period and, thus, is not intended to be comprehensive.

Some of the steamers named in Table 3-2 were involved almost exclusively in what was generally known as the New Orleans-Attakapas or New Orleans-Opelousas-Atchafalaya "trades" (a "trade" represented an area of service, such as the "New Orleans-Attakapas Trade" or the "Red River Trade"), while others also operated in other "trades" on other rivers. The number involved in regular service to the Attakapas region fluctuated from year to year. For instance, *The Planters Banner* noted on May 6, 1847, that only three steamers were in the trade at that time. These were the *St. Mary, Judge McLean*, and *St. Helena*. Later in that year, the paper reported that the steamer *Vesta* had replaced the *St. Mary* (*Planters Banner*, October 21, 1847). Although a few of the steamers, such as the 600-ton, sidewheeler *Selma*, were relatively large, most of the steamboats used in the cross-basin trade were less than 150 ft long and had burdens of less than 200 tons.

Steamboats working in the study area and on other western rivers could be owned by a single individual or by a group. Multiple ownership was very common for steamboats because it spread the costs and risks, which, considering the navigation hazards, could be considerable. Several owners could pool their capital to purchase a boat, which could cost $50,000 or more. A review of enrollment documents of steamboats for the port of New Orleans (WPA 1942) reveals that membership in these consortiums was commonly quite fluid. Sometimes one or several individuals would sell their ownership after only a short time or the proportional ownership of the vessel would shift among the owners; new individuals would buy into the group ownership; or an entirely new group may buy the boat. It was not unusual for the same group of individuals to own several steamboats. The constant and rapid changes in ownership is seen as a reflection of the economics of the steamboat trade. A great deal of money could be made in a short period of time, if everything went right. However, many factors such as boat accidents and losses, poor harvests, low water or bad weather conditions could produce drastic losses, driving individuals out of the trade. In addition, because of the possibility of great profits, competition was often intense, decreasing the stability of the trade and promoting constant and often rapid changes in its participants (Pearson and Wells 1999:3-87).

One expression of multiple ownership was the steamboat company or "line," several of which developed in the study area, although independent boat owners continued to operate throughout the history of steamboats in the area. Commonly, steamboat lines consisted of a loose consortium of steamboat owners or captains who joined together for the economic good of all. Several steamboat lines are known to have serviced the Atchafalaya and Teche regions during the nineteenth century. Many of these lines were very loosely organized companies, more appropriately considered associations, a situation that was common for other Western rivers as well. Sometimes "companies" were organized only for a single season, and over time company names were often similar or identical. Largely because of these factors, no complete listing of steamboat lines operating in the study area has been developed. Waybills found in historic collections provide the names of some of the companies and vessels that were operating in the Atchafalaya Basin. Examples of steamboat companies and vessels they operated during the period of the 1860s to the 1880s include: New Orleans, Opelousas, Atchafalaya and Coast Packet Line (steamer *Golden Era* in 1869); Opelousas and Atchafalaya Saturday Evening Packet (steamer *Lessie Taylor* in 1870 and 1871); New Orleans, Washington and Opelousas Packet Company (steamer *Selma* in 1872); New Orleans and Opelousas Packet Company, 1860s to 1880s (steamers *Yazoo, J.G. Blackford, Ruth*, and *Fanchon*); New Orleans, Atchafalaya and Opelousas Transportation Co. (steamers *Fanchon* and *John Wilson* in 1880) and the New Orleans and Atchafalaya Packet Company (steamer *Warren* in 1884) (Figure 3-6) (Huber 1959; LLMVC, J. and A. Perrodin Papers, n.d.). Tragically, in 1882 the *John Wilson* struck a snag and sank at Richards Landing on the Atchafalaya and 15 persons lost their lives (WPA 1938:185). Steamboat advertisements published in Huber (1959) mention Abe Smith's Teche and Atchafalaya Line, operating the steamer *Eureka* in 1877.

As noted earlier, the steamboats operating in the study area during most of the nineteenth century were generally of less than 400 tons burden and many were less than half of that. Normally, cargo capacity could be figured anywhere from one-third to almost double the measured tonnage (Pearson and Wells 1999). Information on the capacity of one of the Atchafalaya boats, the *Scioto*, is found in an advertisement for her sale appearing in a New Orleans newspaper in 1865. The vessel was described as a "stern-wheel steamer. . . of 450 bales cotton capacity, 110 feet long, 18 feet beam, two fine boilers 16 feet long, 7

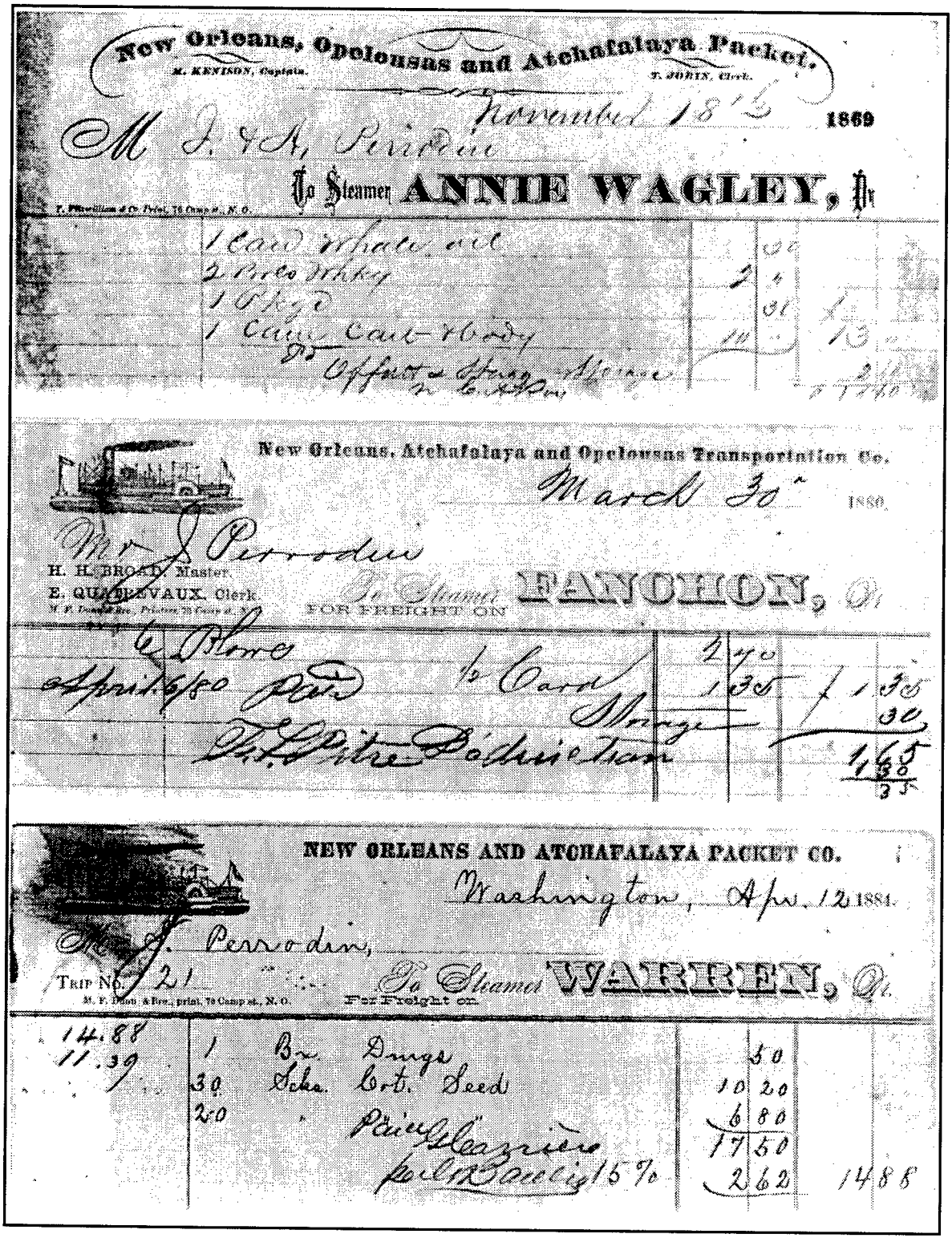


Figure 3-6. Waybills for several steamers associated with steamboat companies operating in the study area (source: private collection).

3/4-inch cylinder, stands A1 in insurance company, and now ready for any voyage" (Huber 1959:79). The 450-bale capacity represents approximately 100 tons or so of cotton and was probably rather typical for most steamers operating in the area, although the larger boats in the Atchafalaya trade could carry up to several hundred tons of cargo.

Steamboat owners, when possible, filled every square inch of cargo space, often putting their boats at risk. Bales of cotton stacked around the guards of vessels often reached the third (hurricane) deck, making for a dark and stuffy trip for any passengers aboard. Steamboat operators, also, tended to run their boats very hard, trying to make the most money in as short a period of time as possible. Much of the reasoning behind this was because the life expectancy of a steamboat on western waters was fairly short. In the mid-nineteenth century the average life span of antebellum steamboats operating on the western rivers was only about 5 years (Fishbaugh 1970:21; Hunter 1949). Pearson and Wells (1999:4-39), in a synthesis of steamboat navigation on the Red River of Louisiana, determined that the average life of steamboats operating there prior to 1860 was only 4 years. This average age increased somewhat in the late nineteenth century, principally, because navigation improvements removed many of the river hazards that had ended the careers of so many boats. A similar short life span would have been experienced by the steamers operating in the study area.

Speed, also, was important to steamboatmen, and advertisements for steamers commonly emphasized that the boat was "fast running." Details on steamboat speed or travel times between ports and landings within the study area are difficult to obtain because of a lack of data. Plus, the speed at which a steamboat could travel was dependent upon navigation conditions which could alter dramatically within the study area over the course of the year. Also, as navigation improvements were implemented in the area overall travel times would have decreased. Information on, at least, proposed travel times are found in steamboat advertisements of the period. For example, an 1861 advertisement for the steamboat *Cricket* noted that the "new, swift, staunch and light-draught" boat would make the run from New Orleans to New Iberia in 14 hours "being the quickest time travelled" (Huber 1959:75).

As shown in Table 3-2, most of the steamers serving the Atchafalaya Basin and Attakapas area were built in towns along the Ohio River, the nation's center for steamboat construction. The Ohio River region had both the raw materials and, after about 1830, the skilled manpower and machinery required to build steamboats. There was an abundance of good timber and there was iron and coal needed to forge and cast metal parts. In the early years, the manufacture of highly specialized machinery and parts was centered around Pittsburgh, but other Ohio River towns soon began to produce these items. Some of the major centers of steamboat construction were Pittsburgh and Brownsville, Pennsylvania; Marietta and Cincinnati, Ohio; Louisville, Kentucky; New Albany, Jeffersonville, and Evansville, Indiana; and St. Louis, Missouri. Some boats were built elsewhere, such as at New Orleans and several surrounding communities, and at numerous small boat yards scattered along the tributaries of the Mississippi. But the output of these locations never came close to the numbers built at yards along the Ohio. Although most Atchafalaya steamboats were built along the Ohio River, many were ordered built expressly for the Attakapas and Atchafalaya trades and were designed for the conditions encountered there. An example was the steamer *Correo* built in New Albany, Indiana, in 1847. The *Planters Banner* for October 21, 1847, contained the following advertisement for the *Correo*:

> The fine new steamer CORREO, J. Johnston, Master, Will leave the Indian Village on Thursdays, at ten A.M., for St. Martinville; returning leaves St. Martinville on Saturday at six A.M. Passengers by this route will arrive in New Orleans on Sunday evening. The Correo is entirely new, built expressly for this trade, is of light draft, runs fast - her cabins in staterooms, and no expense has been spared to render her safe and comfortable. In crossing the lakes this boat will meet with no detention.—Passengers and shippers may rely on strict punctuality. For further information apply on board.

Even during these early years, a few steamboats were built locally. For example, the 108-ft, sidewheeler *Ocean* was built at "Bayou Sorrell" in 1834 and the 106-ft, sidewheeler *Semaphore* was built in Opelousas the following year (Mitchell 1975; WPA 1942). After 1840, the number of steamboats constructed in the study area increased, but even so the local output was small relative to the numbers built along the Ohio river (see Table 3-2).

Steamboat travel in the Atchafalaya region, as elsewhere, could be hazardous. Boilers could explode or bottoms could be punctured by snags. Of the boats listed in Table 3-2, the *Bertrand* was lost on January 17, 1850, in Bayou Sorrel with a load of 250 hogsheads of sugar and just two weeks later the *Grey Eagle* was lost in Grand River with a "heavy cargo" of sugar (*Planters Banner* January 1850).

In 1857, the New Orleans, Opelousas and Great Western Railroad was completed from Algiers on the Mississippi River to the east bank of the Atchafalaya River at Berwick Bay. The railroad built a depot and warehouses and, also, wharves for steamships (Reed 1966:115). At the termination of the railroad, the town of Brashear City, later to become Morgan City, developed. This railroad began to seriously compete with cross-basin trade, and waterborne commerce within the Atchafalaya Basin began a slow decline after the Civil War.

The Civil War

On the evening of November 1, 1862, two United States gunboats, the *Estrella* and *Kinsman*, arrived at Brashear City and immediately exchanged several rounds with the Rebel ironclad gunboat *J.A. Cotton.* The *Cotton* escaped up Bayou Teche, but this action represented the first serious naval engagement in the study area. Over the next two years, a variety of naval operations were conducted in the area. Most of these activities occurred along the Atchafalaya River, Berwick Bay and Bayou Teche. However, some of these spilled over into other waterways of the Atchafalaya Basin. The following discussion describes these naval operations, emphasizing the types of vessels involved in them as well as those lost in the study area.

The *Estrella* and *Kinsman* were members of a small fleet under the command of Lieutenant Commander Thomas M. Buchanan. Buchanan had been sent to the lower Atchafalaya region specifically to try to cut off Confederate retreat out of the area. The Confederates, under General Alfred Mouton, were being threatened by the first Federal forces introduced into the region. These United States troops had been landed at Donaldsonville on the Mississippi River in October, under the protection of the Union gunboats *Kineo, Sciota, Katahdin* (Raphael 1976:42-45). Unfortunately, Buchanan was delayed by low water and by obstructions placed in Atchafalaya Bay by the Confederates and his ships did not reach Brashear City until after the Confederate forces had escaped to the west across the Atchafalaya and up Bayou Teche (Raphael 1976:46-47).

The Federal forces took Brashear City and over the next several months Union gunboats were involved in several engagements with Confederate naval and land forces in the area. In addition to the *Estrella* and *Kinsman*, Buchanan's fleet consisted of the flagship *Calhoun* (Figure 3-7), and the gunboat *Diana*. None of these Union gunboats had been constructed as warships; all had been converted from commercial vessels. The flagship, *Calhoun*, was a 508-ton, walking beam, sidewheeler that had been captured off the mouth of the Mississippi River as a Confederate gunboat in January 1862. There is some confusion as to the identity of this vessel. Some records indicate that before the Civil War this steamer had been named *Cuba* and had been one of the vessels Charles Morgan operated along the Gulf coast out of New Orleans and Brashear City (Gibbons 1989:122; Silverstone 1989:80). Others indicate that the intended name for the boat when launched in New York in 1851 had been *Cuba*, but it had been changed to *Calhoun* prior to completion (Mitchell 1975:28). Whatever the case, the steamer became the privateer *J.C. Calhoun* in New Orleans in the spring of 1861, but was taken into the Confederate Navy later in the year, serving as the flagship of the Confederate fleet on the lower Mississippi River before its capture in early 1862.

The *Estrella* was a 438-ton, iron hulled, ocean-going steamer that had been built in England in 1853 and had served as a merchantman prior to the war. Some records indicate that the vessel had been built as a propeller-driven vessel (Silverstone 1989:90); however, wartime illustrations show it as a sidewheeler. The *Estrella* had been captured in July 1862 attempting to run the blockade at the mouth of the Mississippi River (Pearson and Stansbury 2000:33). Prior to the war, the sidewheeler *Diana* was a commercial packet steamer. She was built in Brownsville, Pennsylvania, in 1858 and first enrolled at the Port of Pittsburgh (Figure 3-8). The *Diana* was 165 ft in length by 26 ft, 4 inches in breadth, 5 ft, 9 in deep and a burden of 239 7/95 tons (Raphael 1993). Her first owner is listed as John H. Sterrett of Houston, Texas, and the 239-ton steamer worked out of Galveston, Texas, before becoming a Confederate transport on the Mississippi River in 1861 and 1862 (Way 1994:128). The *Diana* was captured by the USS *Brooklyn* when New Orleans fell in April 1862 and was used as a transport by the Army before being converted into a gunboat by General Benjamin

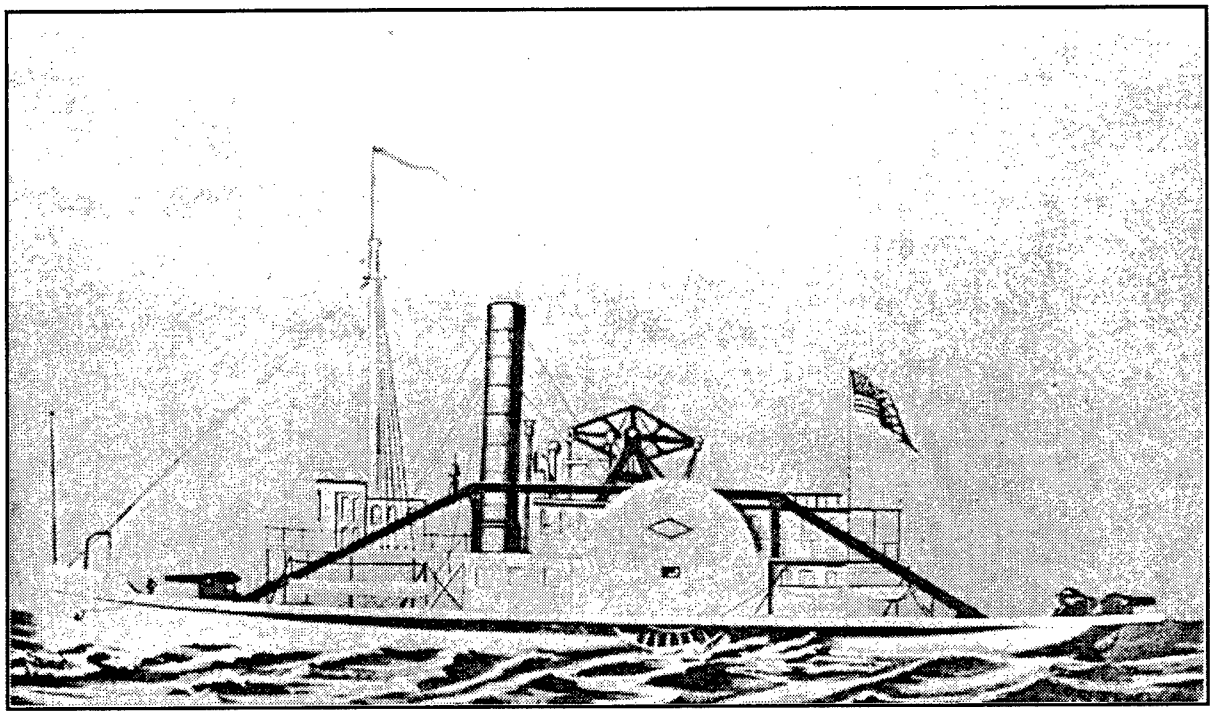
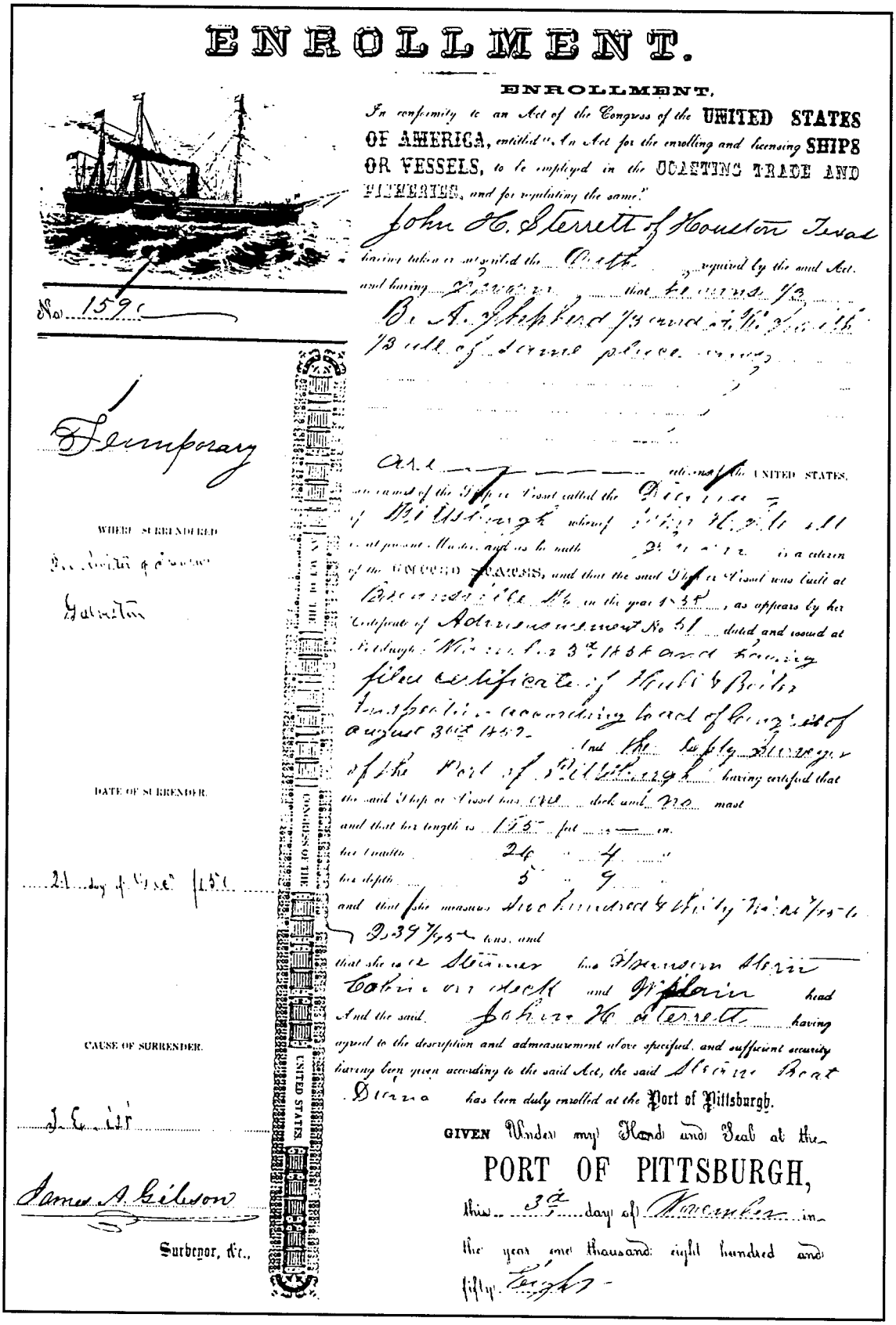


Figure 3-7. Painting of the USS *Calhoun*, flagship of Commander Thomas Buchanan's fleet (Raphael 1976:66).

Butler at New Orleans. This conversion, apparently, was undertaken shortly before the vessel was sent to the Atchafalaya region. Civil War illustrations indicate that the conversion removed much of the cabin superstructure from the *Diana*, leaving a low, armored casemate occupying about two-thirds of her main deck. The casemate was slanted at the forward end and, apparently, the guns were mounted within the casemate (Pearson and Stansbury 2000:40-42).

The gunboat *Kinsman* (or *Col. Kinsman*) was a 170-ft-long, sidewheel steamboat built at Elizabeth, Pennsylvania, in 1854. Originally known as *Gray Cloud*, this steamer had served as a private vessel in the upper Mississippi River trade, as a United States Quartermaster Department vessel in the Sioux Expedition of 1855-1856 and the Third Seminole War of 1856-1859 before being sold to private parties. The *Gray Cloud* was working along the Gulf coast out of New Orleans and Mobile when she was taken over and used by Confederate authorities as a transport in 1861 and 1862. Union forces captured the *Gray Cloud* sometime before July 1862 and she was converted into a gunboat in New Orleans and, ultimately, renamed *Kinsman* (Pearson and Stansbury 2000). When in service in the Atchafalaya region, the *Kinsman* was armed with two guns, both mounted in the open on the main deck, one at the bow and one at the stern. A low, armored casemate occupied the center of the vessel, protecting the engines and boilers.

On November 2, 1862, Federal troops under the command of General Godfrey Weitzel occupied Brashear City, their major purpose being to hold the mouth of the Atchafalaya. Confederate forces, under General Richard "Dick" Taylor, son of President Zachary Taylor, were then primarily located at several points along Bayou Teche to the west of Brashear City. To prevent the Union gunboats from moving up the Teche, Taylor's forces placed several obstructions in the bayou. Just above Cornay's (or Corney's) Bridge they sank the steamer *Fly Catcher* (or *Flycatcher*) and a schooner loaded with bricks to block the channel. The *Fly Catcher* was a small, 74-ft-long, propeller steamer that had been built at Manchester, Pennsylvania, in 1860 (WPA 1942:5:95). Live oak trees were also cut and thrown into the bayou (Raphael 1976:56). On November 3, Buchanan moved his gunboats up the Teche to the obstructions, above which lay fortifications being built by the Confederates (later to become Fort Bisland) and the gunboat *J.A. Cotton.* The Union gunboats and the *Cotton* exchanged fire all day in a ferocious fight, but the gunboats were unable to immobilize or sink the *Cotton* and withdrew.



ENROLLMENT.

ENROLLMENT,

In conformity to an Act of the Congress of the UNITED STATES OF AMERICA, *entitled "An Act for the enrolling and licensing* SHIPS OR VESSELS, *to be employed in the* COASTING TRADE AND FISHERIES, *and for regulating the same."*

John H. Sterrett of Houston Texas

having taken or subscribed the Oath required by the said Act, and having sworn that he was a Citizen of the United States, and that the Steam Boat Diana of Pittsburgh whereof John H. Sterrett is at present Master, and as he hath sworn is a citizen of the United States, and that the said Steam Vessel was built at Brownsville Pa in the year 1858, as appears by her Certificate of Admeasurement No 51 dated and issued at Pittsburgh Nov 3rd 1858 and having first certificate of Hull & Boiler Inspection according to Act of Congress of August 30th 1852. And the Deputy Surveyor of the Port of Pittsburgh having certified that the said Ship or Vessel has One deck and Two mast and that her length is One hundred & fifty five feet — inches her breadth 24 " 4 " her depth 5 " 9 " and that she measures One hundred & fifty Nine 7/95 Tons, and 239 7/95 Tons, and that she is a Steamer has a Square Stern Carvel built and Billet head And the said John H. Sterrett having sworn to the description and admeasurement above specified, and sufficient security having been given according to the said Act, the said Steam Boat Diana has been duly enrolled at the Port of Pittsburgh.

GIVEN Under my Hand and Seal at the PORT OF PITTSBURGH, this 3d day of November in the year one thousand eight hundred and fifty Eight.

No. 159

Temporary

WHERE SURRENDERED

Galveston

DATE OF SURRENDER

21 day of Dec 1858

CAUSE OF SURRENDER

Sold

James A. Gibson

Surveyor, &c.

UNITED STATES

Figure 3-8. 1858 enrollment certificate for the steamer *Diana* (Raphael 1993:40).

Like the Federal warships, the CSS *Cotton* was a converted merchantman. Silverstone (1989:230) notes that the *J.A. Cotton* (sometimes *J.A. Cotten*) was a 229-ft-long, 549-ton, sidewheel steamboat constructed at the Howard Ship Yard in Jeffersonville, Indiana, in 1861. Fishbaugh (1970), whose information may be more accurate, writes that the steamer was built by the Howard Yard in 1860 at a cost of $14,600, was named the "*Jno. A. Cotton*" and measured 248 ft long. This boat was built for the New Orleans & Bayou Sara Mail Line Company to run on the Mississippi River (Way 1994:228; WPA 1942:6:137). When converted into a gunboat by the Confederacy in 1862, the *Cotton* had been partially clad with iron and, reportedly, armed with one 32-pounder smoothbore and one 9-pounder rifled gun (Naval History Division 1971:VI-252; Silverstone 1989:230). However, after the November 3 engagement, commonly known as the First Battle of Cornay's Bridge, the Union fleet commander, Thomas Buchanan stated that the *Cotton* was armed with "one long 32-pounder, four 24-pounders, and two 6-pounder rifle guns" (ORA 1885:184).

Through November, Buchanan continued sending his gunboats up the Teche to harass the *Cotton*, plus he sent them on patrols up the Atchafalaya River. He, also, sent gunboats to Avery Island to dislodge Confederate forces protecting the salt works there. They were repulsed. On one of the patrols up the Atchafalaya River, the *Kinsman* captured two steamers near Grand Lake. These were the *Osprey* and the *J.P. Smith*, both of which were considered too decrepit to keep and so were burned (Official Records of the Union and Confederate Navies in the War of the Rebellion {hereinafter cited ORN] 1905:328). Exactly where these steamboats were burned is not known, but the vessels were supposedly captured in a waterway known as "Bayou Cheval." No information on a steamboat named *J.P. Smith* has been found, however, the *Osprey* (or *Ospray*) was probably the 110-ft, sternwheeler built at the port of Franklin on lower Bayou Teche in 1855 or 1856 (Mitchell 1975:165; Way 1994:359). Before the war, the *Osprey* operated in the Atchafalaya Basin, apparently, involved primarily in carrying lumber. In 1858, "J.B. & S. Cary" placed an advertisement in a New Orleans newspaper for this steamer which stated:

> THE STEAMER OSPRAY
> Will run as a Job Boat in any of the Attakapas waters to Bayou Sale, Vermillion, over the Lake, or anywhere to accomodate [*sic*] customers. As the subscribers have purchased and are now running the Ospray, they will be prepared to deliver lumber from their mill at any place in the trade [Huber 1959:52].

The gunboat *Cotton*, even though it was trapped up Bayou Teche, was a considerable threat to any Union movement to the west. Finally, in January 1863, General Weitzel decided to make an all-out attempt to eliminate the gunboat. On the 13th, the gunboats *Calhoun, Estrella, Kinsman* and *Diana* accompanied by "seven regiments of infantry, four full batteries of artillery, with six extra pieces, and two companies of cavalry," moved up the Teche again (Raphael 1976:68). Facing the Union forces was the *Cotton*, as well as Confederate artillery and infantry lining the banks of the bayou. The *Kinsman* took the lead, but was damaged by a mine (known as a "torpedo") and was forced downstream and out of action. The flagship *Calhoun* moved to the van to take on the *Cotton*. In the heavy fighting that followed the commander of the Union fleet, Lieutenant Commander Thomas Buchanan, was killed, shot through the head with a Minié ball (ORN 1905:517). The *Cotton* was seriously damaged by fire from the gunboats and many of her crew were killed or wounded, including her captain, Edward Fuller, who was shot through both arms. The *Cotton* was forced to retreat, as were the Confederate land forces. The next night the *J.A. Cotton* was set afire and scuttled crosswise in the Teche to create an additional obstruction. The successful Federal forces dropped back down Bayou Teche to Brashear City (Pearson and Stansbury 2000).

On the night of February 23, the Union gunboat *Kinsman* struck a snag while moving up the Atchafalaya. She managed to make it back to Brashear City, but sank in Berwick Bay despite efforts to try to pull her ashore. It is reported that six men were lost in the sinking. Recent COE-sponsored remote-sensing survey and diving operations in Berwick Bay at the entrance to Bayou Boeuf failed to locate the wreck of the *Kinsman*. However, it is believed that the remains of the gunboat are either deeply buried by recent sediments in this area or are located just to the west or north in the very deepest waters of Berwick Bay (Pearson and Stansbury 2000; Saltus et al. 2000).

In March, the gunboat *Diana*, while on a patrol to Patterson on the Teche, fell under heavy fire from Confederate land forces. Seriously damaged, she was forced to surrender and was eventually put into service by the Confederates (Raphael 1976:82-84).

In early April 1863, a large Union force under the command of General Nathaniel Banks, in command of the Department of the Gulf, was concentrated around Brashear City with the intention of moving against the Confederate forces of General Richard Taylor at Fort Bisland, located several miles above on Bayou Teche. With a force of 16,000 troops, Bank's intent was to clear Taylor's forces out of the Teche region and to join with Admiral David Porter's fleet, then on the Red River. One element of the Federal strategy involved boating troops across Grand Lake to its western shore where they landed and crossed overland to Bayou Teche (ORA 1885:294). Several gunboats, transports, and flatboats were used to move and support the Union land forces. Vessels used included the gunboats *Clifton, Estrella, Arizona,* and *Calhoun* and the transports *Laurel Hill, Quinnebaug* and *St. Marys*. At the battles of Bisland and Irish Bend, Confederate forces were overcome and forced to withdraw toward the north. A number of vessels were destroyed or scuttled by the Confederates to keep them out of Union hands as well as to obstruct Bayou Teche. The captured gunboat *Diana* was set afire at Franklin and, when the fire reached her magazine she was "blown to atoms" (Raphael 1976:117). Several other vessels were burned or scuttled. These included the sidewheeler *Blue Hammock*, the sternwheelers *News Boy, Gossamer, Cricket* and *Era No. 2*, and the *Darby, Louise, Uncle Tommy* (Raphael 1976:117). Several of these vessels are known to have worked as commercial steamers in the study area prior to the war. The *Gossamer*, for instance, appears in an 1860 New Orleans newspaper advertisement as a "fast-running and light-draft steamer" bound "For Attakapas via Plaquemine" (Huber 1965:29). Way (1994:193) writes that this *Gossamer* was built in Pittsburgh, Pennsylvania, in 1863, but in light of this advertisement this is impossible. The *News Boy* was a 133-ft sternwheeler built at Brownsville, Pennsylvania, in 1859. This steamboat originally ran on the Red River, but was placed in the New Orleans-Attakapas trade after her purchase by Captain Allen Fowler and several other residents of St. Mary Parish in 1862 (Way 1994:347; WPA 1942:6:210). The *Blue Hammock* was a small, 74-ton sidewheeler built in 1855 at Plaquemine, Louisiana (Way 1994:55).

A Confederate gunboat was scuttled in Bayou Teche on April 15 about two miles below New Iberia. The vessel is called the *Hart* as well as the *Stevens*. Taylor had ordered the unfinished gunboat, reportedly a packet steamer previously named *E.J. Hart*, destroyed by fire and sunk in the channel (Irwin 1985:122). No record of a steamboat called *E.J. Hart* has been found and it is possible that this boat was the *Ed. R. Hart*, a sidewheel steamboat built in Paducah, Kentucky, in 1860 (Way 1994:141). The 132-ft-long *Ed. R. Hart* was enrolled in New Orleans in November 1860 by her owners, two residents of Pointe Coupee Parish (WPA 1942:5:74). According to Raphael (1976:132-133), the *Hart/Stevens* was "described as one of the best and fastest gunboats in the Rebel Navy." She was partially armored with 3-in-thick railroad iron and was powered by two engines with cylinders 27 inches in diameter and with 7-in strokes. She had 4 double flue boilers and carried two rifled 32-pounders and two brass 24-pounder smooth bores. The *Hart* was scuttled at Oliver's Landing, almost directly in front of the Eugene Oliver residence on the Teche (Figure 3-9). Later that fall, Union forces moving up the Teche removed much of the gunboat that was blocking the channel. Captain Charles S. Bulkley, a demolition expert and superintendent of the U.S. Military Telegraph Service for the Department of the Gulf, was in charge of the work to remove the obstruction. Most of the work was done by the 3rd Engineers, Corps d' Afrique, an all-black unit who were diving with ropes and attaching cables to trees so teams of mules could pull pieces of the wreck to shore. Demolition teams also placed charges on the hull and blew up portions of the wreck (Edmonds 1979:81).

It was during the activities in April, that the Confederate ram *Queen of the West* was destroyed on Grand Lake. The *Queen of the West* was a 181-ft sidewheel packet that had been built in Cincinnati, Ohio, in 1854. In 1862, the steamer was converted into an Ellet ram by the Union and at the Battle of Memphis had rammed and sank one Confederate vessel and captured another. In February, 1863, on the lower Red River, the *Queen of the West* had captured several Rebel vessels before she ran aground near Fort De Russey and was captured herself (Way 1994:382). The Confederates kept her as a gunboat, cladding her with cotton bales for protection. In April 1863, the gunboat had been dispatched from Butte La Rose with reinforcements to strengthen Taylor's force at Fort Bisland. According to some sources, the *Queen of the West* was accompanied by two troop transports, the *Grand Duke* and the *Mary T.*, although Scharf (1977) indicates that she was accompanied by only one vessel, the *Minna Simmons*. This was probably the *Nina Simmes*, a sidewheeler involved in the Atchafalaya Basin trade before the war. The Confederate flotilla was sighted on April 14 by Union naval forces consisting of 3 gunboats; the *Calhoun*,

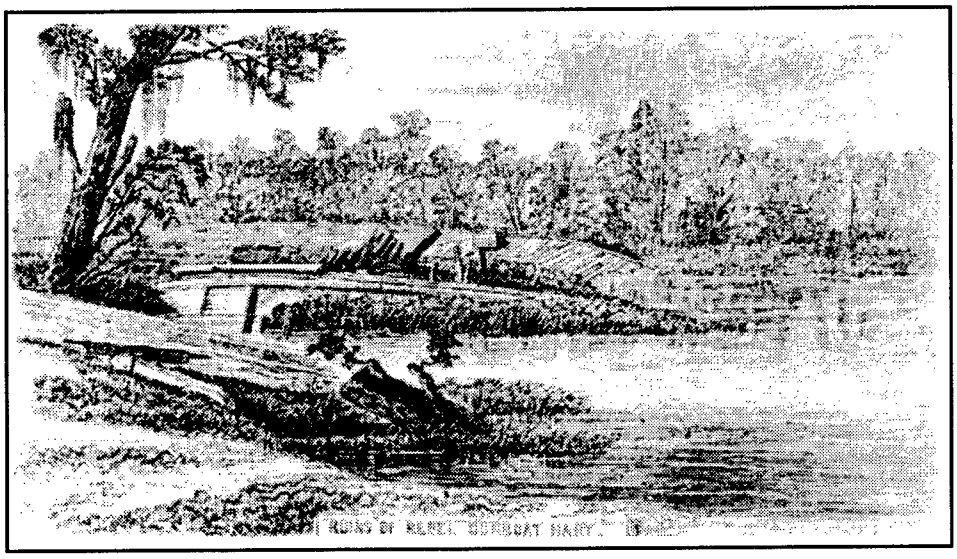


Figure 3-9. Wreck of the Confederate gunboat *Hart* in Bayou Teche near New Iberia (Edmonds 1979:82).

the *Estrella* and the *Arizona.* Accounts of the action which soon followed are found in the logbooks of the Union gunboats. The *Calhoun* was lying at anchor off Indian Bend in Grand Lake when, on April 14:

> At 5 am, the man on the lookout reported two steamers about one mile ahead on the starboard bow. - At 5:10 am, called all hands to quarters slipped the chain and steamed ahead at 5:15 opened fire on the "Queen of the West" and steamer "Minnie Simmons" at 5:20 the "Queen of the West" received a shell penetrating her steam chest and set her on fire. Causing her crew to leave her. At 5:35 lowered the Second Cutter and sent her in charge of Mr. J.M. Chadwick our Executive Officer to assist in forcing up their crew of the Burning Steamer which drifted down the lake and blowed up at 7:40 [National Archives, *Calhoun* Logbook, April 14, 1863].

There is some discrepancy between the log of the *Calhoun* and the log of the *Estrella* on the exact time this action took place. The logbook of the *Estrella* states:

> From 4 to 8 AM. Fresh southerly breeze and thick weather, at 5:45 AM the fog lifting lighted two confederate steamers 3 points on our starboard bow called all hands to quarters, and went with the Arizona and Calhoun in company after them, 6:15 AM the confederate steamer which I found to be the Queen of the West, Capt. Fuller, took fire from the explosion of our shells and was burned to the water edge, the water ? or steamer lying a fast boat of light draft escaped after picking up the Queen of the West's crew returned to our anchorage at Mrs. Hutching's Plantation at 7 AM [National Archives, *Estrella* Logbook, April 14, 1863].

A notation in the *Calhoun* logbook the next day states, "At 5 PM the Arizona arrived and made fast to the "Estrella" with 5 guns taken from the wreck of the "Queen of the West" (National Archives, *Calhoun* Logbook, April 15, 1863). It was estimated that from 26 to 40 persons were killed in the fire and the explosion on the *Queen of the West* (Scharf 1977:363; Way 1994:382). The Confederate transport (or transports) with the *Queen of the West* escaped to Butte La Rose.

With the retreat of most of Taylor's forces from the region, four Union gunboats, the *Calhoun*, the *Estrella*, the *Arizona* and the *Clifton,* steamed up the Atchafalaya Basin and were able to capture Fort Burton at Butte La Rose. On April 22, members of the 162nd New York, the 1st Maine battery and a troop of 2nd Rhode Island cavalry marched on Barre's Landing (Port Barre) and captured the last of the Confederate Teche fleet, the steamer *Ellen* (Irwin 1985:127).

One outcome of this Union campaign was the production of fairly detailed maps of the waterways

within the Atchafalaya Basin by engineer Henry Abbot (1863a, 1863b). A section of Abbot's (1863b) map depicting the Grand Lake region of the Atchafalaya Basin between Upper Grand River and Grand Lake, is shown as Figure 3-10. Two sawmills are shown on this section of Abbot's map. These are "Offit's Sawmill" (owned by Nathaniel Offit), located along Upper Grand River at the confluence with Bayou Tensas, and "Fuller's Sawmill," located on an island between Lake Chicot and Grand Lake (Figure 3-10). This map, also, provides one of the few specific depictions of commonly used, mid-nineteenth century navigation routes in the study area. For example, on Figure 3-10 the "ROUTE TO ATTAKAPAS COUNTRY" is shown following Bayou Sorrel, through the upper end of Lake Chicot, through Bayou Chene, across "Lake Mongouloa," and along Bayou La Rompe. This was the principal steamboat route across the Atchafalaya Basin, entering the area at Plaquemine on the Mississippi River and following Bayou Plaquemine and Grand River to Bayou Sorrel. This route could be taken up the Atchafalaya River to the port towns of Washington and Port Barre via Bayou Courtableau. As seen in Figure 3-10, another route branched off of this principal one in the upper end of Lake Chicot and ran south through a "Pass" by Fuller's Sawmill and on into Grand Lake. This route could be followed down Grand Lake to landings on its western side or on down the Atchafalaya River to the entrance of Bayou Teche or Brashear City.

Later, in June 1863, with Union attentions directed toward the capture of Port Hudson on the Mississippi River, General Taylor initiated a plan to retake the lower Teche, Atchafalaya, and Lafourche regions. Part of this plan included moving troop by boat across the Atchafalaya River and down the eastern edge of the Atchafalaya Basin to capture Brashear City. Simultaneously troops were to move down the Teche. Those moving down Bayou Teche, under command of Major Hunter, were loaded into a flotilla of small boats when they reached the lower Teche. This flotilla, consisting of 53 skiffs, pirogues and batteaus, and known as the "Mosquito Fleet," passed down the Teche, through the lower Atchafalaya River at Patterson, across the lower end of Grand Lake to Lake Palourde from where they could attack Brashear City from the north (Raphael 1976:167-168). The Confederate forces were able to retake the city but held it for only a month, pulling back up Bayou Teche in the face of Federal troops who reoccupied Brashear City on July 25 (Saltus et al. 2000:31).

In September of 1863, Federal forces initiated another campaign to retake the lower Atchafalaya region and to move on to the west to invade Texas (Edmonds 1979:5-6). Nathaniel Banks, also, was commander of this effort, known as the Great Texas Overland Expedition. United States land forces departed Brashear City and moved up the Teche, supported by gunboats and other vessels. The gunboat USS *Clifton* bombarded the town of Franklin in October. From New Iberia the forces moved overland to Opelousas near where the expedition was halted. Low water on the streams of the Atchafalaya Basin inhibited shipment of supplies to Union forces and, eventually, they were forced to retreat under harassment by Rebel troops. The Federal forces withdrew to the Teche and spent the winter of 1863 at New Iberia and St. Martinville.

In addition to low water, the numerous obstructions left by the Confederates along Bayou Teche had made it difficult for Union gunboats to enter the upper reaches of the bayou. As a result, efforts were made to remove the obstructions with demolition teams. In a report dated November 6, 1863, Captain Charles S. Bulkley, the Assistant Quartermaster and Assistant Superintendent of the U.S. Military Telegraphs, described the removal of obstructions:

> COLONEL: I have the honor to report in regard to the operations in Bayou Teche that I was ordered by Major-General Banks to proceed up the above-named bayou with the necessary apparatus, and, with the aid of a colored regiment of the engineers' service, to remove the obstructions, consisting of two sunken vessels filled with brick, secured by piles driven around them, and the iron-clad gun-boats, Cotton and Hart, making in all four barriers, completely closing the bayou. The water being shallow and the vessels embedded in the muddy bottom, it was impossible to operate with powder inside their hulls owing to the slight resistance the shallow water would give us above the charge, nor could the charges be successfully placed beneath them with the means at my disposal. The only course left was to place them as low as possible alongside the hulls. The first charge of eighty pounds was exploded near the bow of one of the vessels filled with brick, which moved her bodily twenty feet, tearing down the piles and discharging part of her brick cargo; with twenty-five-pound charges she was then broken up and hauled to the banks. Vessel No. 2 was removed in the same manner,

Figure 3-10. Detail of Henry Abbot's 1863 map of the Grand Lake region of the Atchafalaya Basin. Note the steamboat route labeled "Route to Attakapas Country" (Abbot 1863b).

> but with less powder, not being so thoroughly filled with brick. The gun-boat Cotton was found loaded with her heavy machinery; rather than risk the chances of dropping this in the bayou, we removed her stern only. In this case one charge of eighty pounds was used inside her hull with goods effect, considering the shallow water only six feet in depth. Small charges of twenty-five pounds alongside the fragments completed the removal. The gun-boat Hart also had her machinery on board and three large boilers which were under water, securely bolted to her hull and connected with large boiler-iron pipes. We succeeded in placing a charge of fifty pounds under these near the farther end from shore. By this explosion they were torn from their fastenings and landed near the bank of bayou, besides shattering the hull. Our next charge of 200 pounds was placed alongside, directly amidships in water nine feet in depth. This removed her center from side to side completely, and her ends were rapidly hauled near the bank. This cleared the bayou, and rendered it navigable for our steamboat transportation. In removing these we expended 750 pounds of powder and used three cups of Grove battery to ignite the charges. Our conducting wires were 2,000 feet in length, the electric current passing from this over a small platina wire fixed in a cartridge in the case containing charge. This conducting wire is part of a lot captured in New Orleans of Confederate manufacture, rather imperfect, and intended for exploding torpedoes in the Mississippi River [ORA 1899:978-979].

On January 6, 1864, after an outbreak of smallpox in New Iberia, Union forces fell back toward Franklin. The trek to Franklin was during a driving ice storm through ice and mud. Many of the soldiers compared this to Napoleon's retreat from Moscow. Some soldiers were made their way by floating "themselves and their confiscated goods down the Teche in cauldron kettles, skiffs, sugarrollers, massive wooden plantation doors, and even armoires supported on rails" (Edmonds 1979:394). In the spring, Union forces attempted to move into Texas via the Red River but were unsuccessful and withdrew back to the Mississippi River. This, also, resulted in the removal of most Federal troops from the Atchafalaya Basin region. Subsequent to this, there was little naval activity in the interior of the study area.

Some naval activity, also, took place along the coastal region of the study area. The Union blockade was put into place off of coastal Louisiana early in the war. The naval fleet operating along the central and southwestern Louisiana coast was the Gulf Blockading Squadron, renamed the West Gulf Blockading Squadron in January 1862. A few minor engagements occurred off the coast, but most of the Federal fleet's effort was directed at suppressing commercial shipping, which resulted in the capture of a number of blockade runners operating in the study area. One of the few armed ship actions occurred at the entrance of Atchafalaya Bay between the USS *Hatteras* and a steamer believed to be the armed "rebel steamer *Mobile*" (ORN 1903:97). In January 1862, these two vessels exchanged fire for about an hour with no damage to either vessel.

A few larger steamers attempted to sneak in or out of the study area's myriad of waterways, but most of these blockade runners were small sailing vessels about which little is known. On May 6, 1862, Commander George Emmons of the USS *Hatteras* reported that he had chased a steamer aground on a "reef within this bay," apparently referring to Atchafalaya Bay (ORN 1904:462). The steamer, which was set afire and destroyed by her crew, was outbound from Berwick Bay for Cuba with cotton and turpentine and Captain Emmons supposed her to be a vessel named *Fashion*. Although the identity of this ship is unclear, it may have been the 190-ft, two-masted, steamer *Fashion* registered in Mobile in 1859 and owned by the Mobile & Nicaragua Steamship Company (WPA 1942:5:91). Only a week later, on May 12, Captain Emmons and the *Hatteras* forced a rebel steamer identified as the *Governor A. Mouton* ashore somewhere just south of Vermilion Bay. The crew of the *Governor Mouton* set their vessel on fire, but the men from the *Hatteras* were able to extinguish the flames and get the steamer off the shore (ORN 1904:486-487). On board the *Governor Mouton* was a cargo consisting of foodstuffs as well as a small quantity of shot and powder. The identity of this steamer is unknown, but it is likely to have been only recently renamed, after Alfred Mouton former Louisiana governor and at the time general in the Confederate army.

Examples of some of the sailing vessels captured in or near the offshore portion of the study area include the schooner *Isabel*, captured by the USS *Montgomery* off Atchafalaya Bay on February 1, 1862; the schooner *Magnolia*, captured on May 1, 1862, by the USS *Hatteras* while attempting to leave

Berwick Bay with 212 bales of cotton; and what was described as the "Confederate sloop *Poody*," captured off Vermilion Bay on May 17, 1862, also, by the USS *Hatteras* (ORN 1903:130, 1904:461, 500). The 20-ton *Poody* was sailing out of the Sabine River, bound for Berwick Bay, and had on board a cargo of flour, cornmeal and coffee. Another sailing vessels that attempted to run the blockade into the Terrebonne Bay area was the 90-ft schooner *Major Barbour* (ORN 1903:88; WPA 1942:5:165). In February 1862, the Union blockading vessel USS *DeSoto* captured the *Major Barbour* "inside of Isle Derniers" as the schooner was attempting to run the blockade from Havana. The *Major Barbour* was carrying a valuable cargo including gunpowder and percussion caps (ORN 1903:88). Considering its point of capture, inside of Isle Derniers, it appears as if the schooner was in the vicinity of Lake Pelto or western Terrebonne Bay, possibly attempting to enter one of the bayous there, such as Petit Caillou or Sale. In the same month, a Union report appeared stating that the blockade runner *Miramar* had come in at the "Grand Caillou," probably referring to Bayou Grand Caillou (ORN 1921:683). Another unsuccessful blockade runner was the schooner *Mandoline* which was captured off Atchafalaya Bay on April 14, 1864, by the Union vessel *Nyanza* . The *Mandoline* was carrying a load of 20 bales of cotton and was leaving from Vermilion Bay and bound for Tampico, Mexico (ORN 1904:194).

The state of Louisiana actually had its own small navy during the early days of the war, consisting of several armed vessels. One of these was the Louisiana State Schooner *Antonia* which was dispatched to the Timbalier Islands in September 1861 to provide assistance to two schooners "loaded with arms for the State or for the Confederacy" (Pearson 1993:472). The outcome of this venture is unknown, but the *Antonia* patrolled the coastal area until the fall of New Orleans in April 1862.

Blockading running and smuggling remained active in the lower Terrebonne area during most of the war. In 1864, Union officer Captain Moore was sent to Bayou Grand Caillou to try to locate and break up a group of Confederate smugglers. Raids were planned and carried out capturing considerable amounts of food and equipment and a few small boats were destroyed. One boat was mentioned that was not captured. This was a small schooner that was being used as a blockade runner (ORA 1893:927-929).

Waterborne Commerce in the Study Area After the Civil War

After the Civil War there was a significant drop in commercial vessel activity in the study area. This was principally a result of the general social and economic disruptions brought about by the war. Another factor contributing to the drop in commercial water traffic was the completion of the railroad from New Orleans to Brashear City (Comeaux 1972:17). By the early 1870s, however, navigation of the Atchafalaya area was again considered necessary, implicit in the Army Engineer's survey of the Atchafalaya River in 1873-1874. That survey noted that the river had a relatively deep channel, averaging over 20 ft (6 m) deep, for most of the distance between the Red River and Berwick Bay (at Morgan City), although there were numerous shallow shoals. Many small feeder channels were noted along the length of the Atchafalaya River; however, their navigation was often heavily dependent upon water stage and the nature of rafting (CE 1874). The 1874 Corps' report presented the following information on commerce on the basin waterways:

> The products of the Atchafalaya country are cotton, sugar, molasses, moss, lumber, staves and shingles. The cotton is all grown above the Courtableau and is sent to New Orleans by the two steamers that run to Washington, or the one that makes a ten-day trip to the Teche country.
>
> The lumber and staves are rafted down to Brashear and the Teche, seven small steamers being engaged in this trade.
>
> Flat-boats and broad-horns from Indiana and Ohio bring down hoop-poles, flour, bacon and provisions, for sale on the Teche, generally taking the route by Grand River, Seventh Tensas, Jake's and Rigaby's Bayous, making as short a run over Chicot and Grand Lake as possible, and keeping as near to the left bank as the depth will permit, in order to find shelter in the bayous in case of wind. United States contractors for live-oak have a depot at the one hundred and thirty-fourth mile, on Berwick's Bay, where they collect large supplies of this valuable material from points as far above as the Bayou Chene, and ship by schooner [CE 1874:771-774].

This account is useful because it provides information on the types of boats plying the Atchafa-

laya Basin and their cargoes. It is certainly noteworthy that flatboats were still being used in the area in the 1870s, over 50 years after the introduction of the steamboat.

In order to avoid potentially dangerous boat travel across the open Gulf of Mexico, vessels bound to the east often meandered through an elaborate system of interconnecting streams across the basin. In 1885, the Army Engineers noted that this 425-mi water route followed: ". . . the Teche into the Atchafalaya, Grand Lake, Lake Chicot, Lake Mongoulois, bayous La Rompe or Little Tensas into the Grand or Atchafalaya river again, thence into the Mississippi, through Old River, to New Orleans . . . ." (CE 1885:1434).

Although the water route across the Atchafalaya Basin was cheaper, by the 1880s shippers preferred to use the railroad. The Southern Pacific Railroad had branches at Opelousas and St. Martinville and paralleled the Teche along a large portion of its course. Steamboats on the Teche acted as feeders to the railroad (Switzer 1889:149). By 1885, the Morgan Railroad accounted for 90 percent of the commerce between the Teche country and New Orleans (Pearson et al. 1989:263).

By the 1870s, numerous steamers traveled to the Atchafalaya and Teche region from New Orleans. Among these were the 124-ft *Fleta*, the 125-ft *Big Sunflower*, the 123-ft *Cleona*, the 160-ton *Amaranth*, the 110-ft *Scioto*, the 130-ft *Trenton*, and the 171-ft *Bradish Johnson*; the last two making weekly trips to the interior ports of Port Barre and Washington. As seen in Figure 3-11, goods were still transferred from these steamers to barges to reach landings along the shallow streams in the upper basin, such as Bayou Boeuf and Bayou des Glaises. Advertisements for these and many other steamboats bound for ports and landings in the study area appeared in the New Orleans newspapers. Even as late as the 1860s, some of these advertisements were in French. For example, an 1868 advertisement noted that the "bateau de vapour" *J.D. Hinde* would "partira pour les Attakapas, directement, . . ." (Huber 1959:35).

In addition to regular steam packet traffic, coal barges continued to carry their cargo downstream to Morgan City and Bayou Teche, and cypress logs from the Atchafalaya Swamp were shipped and floated across the basin to lumber mills along the lower Atchafalaya River. Small channels in the basin, such as Bayou La Rompe and Bayou Little Tensas, which had been commercially important in the nineteenth

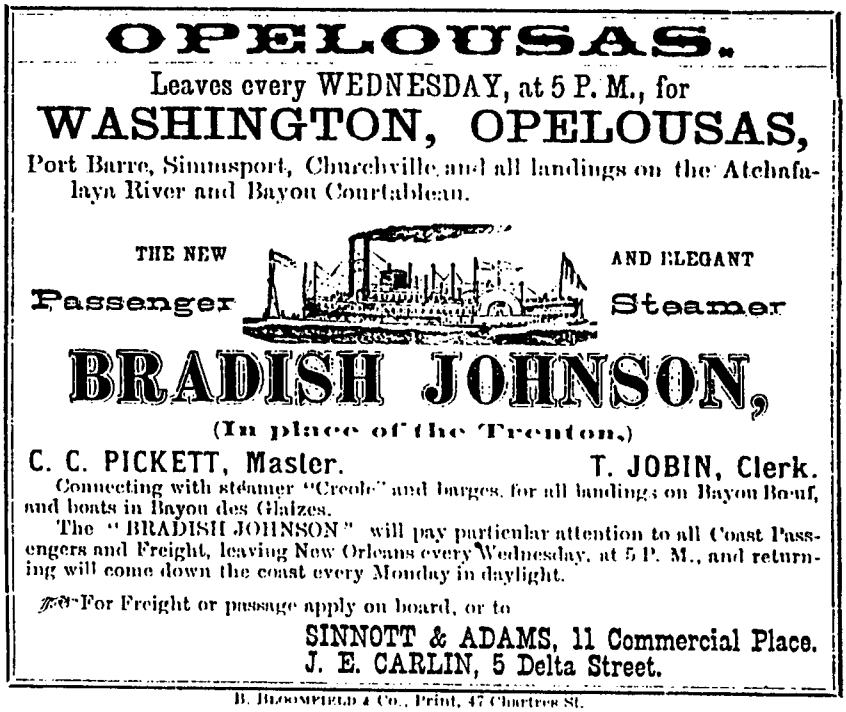


Figure 3-11. Circa 1870 hand card ("dodger") for the steamer *Bradish Johnson* (Huber 1959:34).

century, were rarely utilized in the twentieth century.

While waterborne commerce within the Atchafalaya Basin decreased after the 1880s, it did not end. Three steamboats were reportedly running from the Atchafalaya Basin area to New Orleans in 1886, the *H.J. Dickey, New Iberia* and the *Queen City*. In that year, the *Dickey* made 13 trips, the *New Iberia* - 17 trips and the *Queen City* - 8 trips (Switzer 1889:137-138). In July of that year, the *New Iberia* was destroyed by fire while in New Orleans (WPA 1938:250). Despite the competition from railroads, the region continued to be serviced by small steamboats well into the twentieth century. Among the steamers operating in the early-twentieth-century were the *F.M. Owens* (Figure 3-12) and the *J.E. Trudeau* (Figure 3-13). The *F.M. Owens* was lost in a hurricane on the lower Mississippi River in September 1915 (WPA 1938:115). The last steamboat known to have operated on Bayou Teche was the *Amy Hewes*, a sternwheeler used primarily as a logging boat to haul rafts of cypress logs out of the Atchafalaya Basin to local sawmills. The *Amy Hewes* ceased operating in 1943 (Goodwin et al. 1985b:188) and was certainly one of the last steamers running in the study area.

Trade Along the Gulf Coast and the Development of the Morgan Line

During the period following the Civil War, waterborne commercial activity increased from Brashear City (soon to be Morgan City), principally because of the activities of shipping magnate Charles Morgan who came to dominate the coastal steamer trade in the Gulf of Mexico. It was in the late 1830s that steamers first began to make serious efforts to challenge the sailing packets on the coastal and ocean routes into the Gulf of Mexico. The sea route from New York to New Orleans, the major port on the Gulf of Mexico, covered over 1700 mi and was considered so hazardous in the 1830s that it cost less to insure a ship for the voyage to Europe than for the Gulf. Sailing packets retained a firm hold on this route until the late 1840s, when steamers grew larger, faster and, most importantly, more seaworthy (Baughman 1968:12-21). One of the early steamers to operate along the Gulf in the study area was the sidewheeler *Merchant*, built in Baltimore in 1835. The *Merchant* had a listed burden of 305 13/95 tons; was 151 ft, 8 in long; 25 ft, 6 in wide and had a depth of 8 ft, 4 in (BMIN 1835). Soon after being built, the *Merchant* was taken to New Orleans and began to operate between that city and other Gulf coast ports. By 1836, she was owned by the Merchant Steamboat Company of New Orleans, who continued to operate her in the coastal trade. The details of the *Merchant's* activities are unknown, but she was reported stranded on West Timbalier Island in early October 1842 with a loss of 8 lives (Mitchell 1975:281).

Steam navigation within the Gulf of Mexico by the *Merchant* and similar vessels was financially successful and the Gulf trade was seen as an exciting opportunity by businessmen in New York, led by Charles Morgan (Pearson and Simmons 1995). Morgan, eventually to become one of the most prominent figures in American steamboating and railroading, was born in Killingworth, Connecticut, on April 21, 1795. As a young boy of 14, he traveled to New York City where he obtained a position as a retail grocery clerk (Baughman 1962:6). By 1815, he owned his own ship chandlery and soon thereafter he expanded his business to include importation of goods from the West Indies and the southern states. During this period he purchased interests in the Charleston Ship Line, a fleet of coastal packets sailing between New York and Charleston and other southern ports, and in 1831 he purchased half interest in the barque *John W. Cater* that was used in the West Indies trade (Baughman 1962:7). In 1832, Charles Morgan became involved in the then fledgling ocean steamboat trade. He had James P. Allaire construct the 136-ft sidewheel steamer *David Brown* and placed her in the lucrative New York to Charleston run (Baughman 1962:10). Soon Morgan added other steamers to this line, eventually to be called the Charleston Steam Packet Company. The steamers to Charleston cut the sailing time in half, and shippers and passengers were attracted to Morgan's boats. Reportedly, these steamships were making $1,000 to $2,000 profit per trip (Baughman 1962:11).

Morgan and his associates recognized the economic potential of maritime trade along the Gulf coast. The volume of trade down the Mississippi River was huge and growing, and New Orleans was the "hub of the Gulf, her commerce reaching up the Mississippi, and coastwise to Cuba, Mexico, and the new Republic of Texas" (Baughman 1962:17). Although Charles Morgan and his partners considered the steamboat trade between New Orleans and New York, they opted to concentrate their efforts within the Gulf of Mexico, particularly the trade between New Orleans and the Republic of Texas. In the fall of 1837, they placed the steamer *Columbia* in service between New

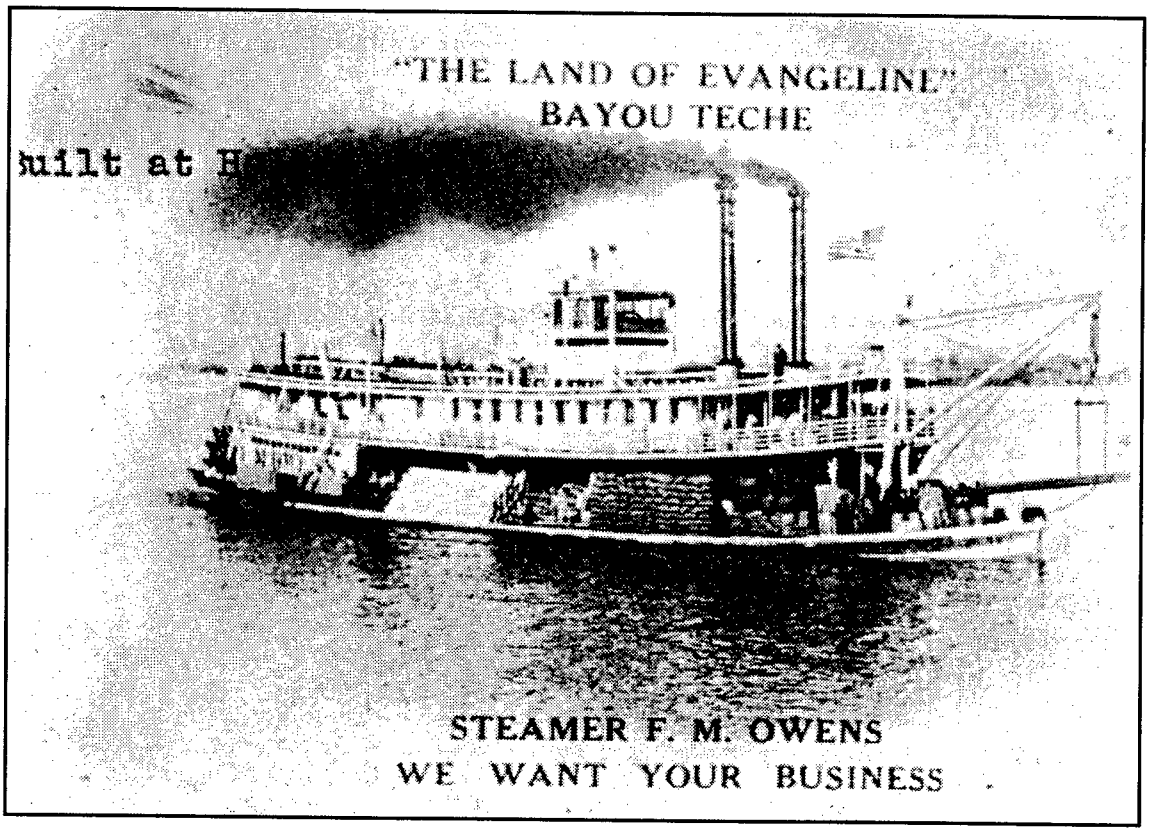


Figure 3-12. **Steamboat *F.M. Owens* (source: Louisiana and Lower Mississippi Valley Collections, Louisiana State University Libraries).**

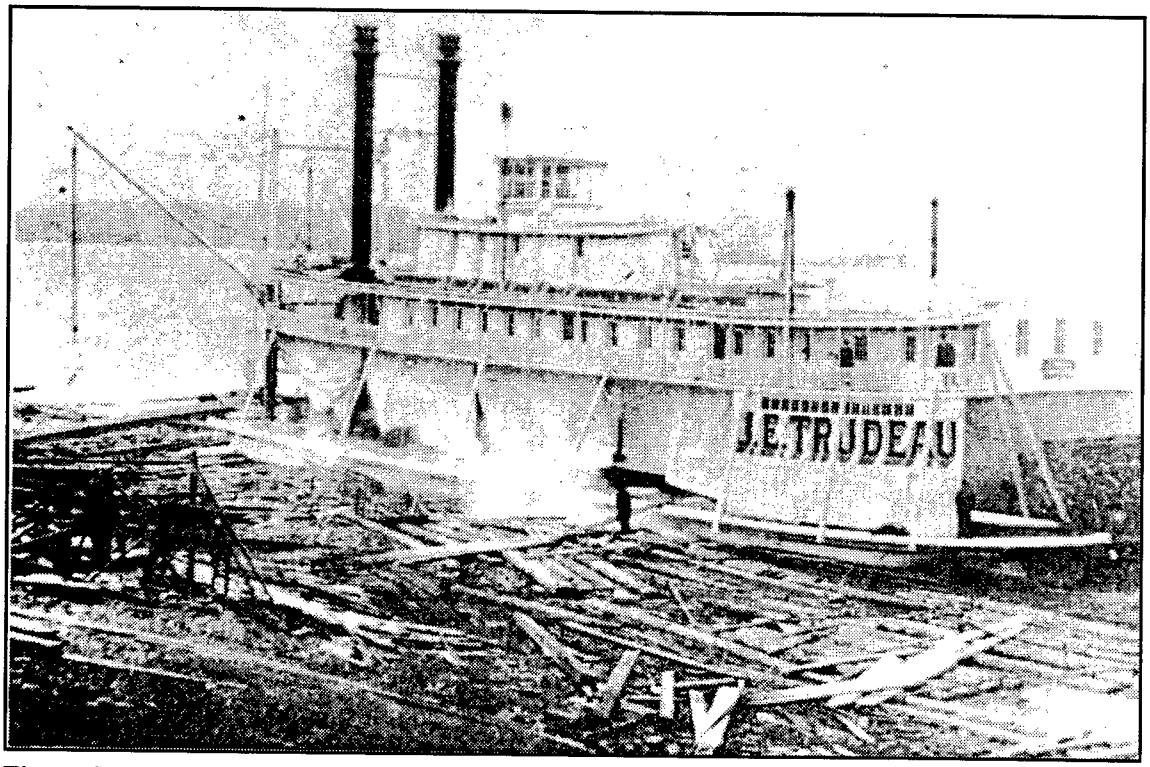


Figure 3-13. **Steamboat *J.E. Trudeau* (source: Louisiana and Lower Mississippi Valley Collections, Louisiana State University Libraries).**

Orleans and Texas. The *Columbia* arrived in New Orleans on November 18, 1837, and made her first voyage to Galveston on the 25th (Baughman 1968:12-21). The arrival of the *Columbia* essentially inaugurated coastal steamship travel in Texas and represents the birth of the Morgan Line.

Morgan's *Columbia* was the first well-equipped seagoing steamship on this route, with accommodations for more than 30 cabin passengers and as many deck passengers. The accommodations were very good, with a French cook and white-clad waiters serving the dining room, linen bedding, chambermaids, and up-to-date water closets (Pearson and Simmons 1995). The *Columbia* was built in New York City in 1835. She was 164 ft, 6 in long; 22 ft, 6 in wide; 11 ft, 10 in deep; and had a burden of 423 18/95 tons (WPA 1942:3:44). Subsequent vessels owned by Morgan and used in the Gulf coast trade, many of which operated out of Morgan City, shared many characteristics with the *Columbia.* Most were built at yards in New York, Wilmington, or other Atlantic coast ports where the facilities and expertise for building ocean-going vessels were available. These ships were sidewheel steamers, or, particularly in later years, propeller steamers, and characteristically had moderately deep drafts on the order of 8 to 15 ft. Many of the later Morgan Line vessels were constructed of iron and a great number of these were built at the large and well known Harlan & Hollingsworth Company yards in Wilmington, Delaware (Pearson and Simmons 1995). These vessels proved to be admirably suited for the conditions found along the Gulf coast, plus they did not have to contend with the difficult sailing conditions often found in the Atlantic.

When he started his Gulf operations in the 1830s, Charles Morgan had used various New Orleans factors and commission merchants to serve as agents for his vessels. These firms handled the daily management, operations, and scheduling of the ships, and, apparently, conflicts had arisen over the years. In 1847, the firm of Harris & Morgan, located at 79 Tchoupitoulas Street in New Orleans, took over as agent for the Morgan Line. This firm consisted of Charles Morgan's son-in-law, Israel C. Harris, and his son, Henry R. Morgan. In addition to managing the ships, this firm also owned a small interest in most of Charles Morgan's vessels operating in the Gulf of Mexico (Baughman 1962:61). The line was initially known as the Southern Steamship Company.

Various disasters struck several of Morgan's vessels. The *Nautilus* went down in a hurricane at Isles Dernieres, Louisiana, in 1856, with the loss of 20 lives. This loss occurred within or very near the present study area. Another Morgan steamer, the *New York*, sank in the Gulf of Mexico off the coast of southwestern Louisiana in September 1846 (Pearson and Simmons 1995:57, 59).

The Civil War disrupted all commercial activities in the Gulf of Mexico for several years. Charles Morgan remained a resident of New York all his life, but his son-in-law and partner in New Orleans, Israel Harris, was a loyal Confederate and tried to keep the Southern Steamship Company running on its normal schedules for several months after the War began. He was ultimately unsuccessful though, and most of the company's steamers were seized by the Confederate government by January 1862 (Baughman 1968:120).

The traditional transportation patterns along the Gulf coast changed rapidly after the Civil War. There was little or no land transport available to New Orleans, thus making water routes essential. For many years, Morgan (and others in the Gulf carrier business) did not interfere or become involved with interior shipping, but as inland transportation (mainly in the form of railroads) developed, to some extent in the 1850s and in earnest in the 1870s, the character of traffic to the ports changed accordingly, with transportation no longer limited to the river courses. To survive in the increasingly competitive market after the Civil War, the water carriers had to become more conscious of, and eventually involved in, land transportation (Baughman 1968:136-138).

The New Orleans, Opelousas, and Great Western Railroad was completed in 1857 from Algiers to the community of Brashear City on Berwick Bay, within the present study area. Among the prominent investors in the railroad were Cornelius B. Payne and the firm of Harris & Morgan, both major owners of the Southern Steamship Company. In 1869, Charles Morgan purchased the bankrupt New Orleans, Opelousas, and Great Western Railroad, and renamed it Morgan's Louisiana and Texas Railroad. By the mid 1870s, in connection with his developing interests in railroading, Morgan had shifted most of his steamship activity from New Orleans to the port facilities he had built at the Brashear railroad terminus on the banks of the Atchafalaya River at the head of Berwick Bay. Merchandise and passen-

gers would be carried by train between New Orleans and Brashear City, where the steamers would be met. This eliminated the almost 200-mi round trip on the Mississippi River that the steamships formerly had to travel to reach New Orleans. Although management of the Morgan Line remained in New Orleans, extensive docking and freight facilities were constructed at Brashear City. By the mid-1870s, Morgan's wharfs stretched for half a mile along the Atchafalaya River, and he had built warehouses, cattle pens, coal yards, and marine ways, all employing some 800 men. Baughman (1962:207) reports a contemporary traveler observing that except for "keepers of barrooms [and] restaurants" everyone in Brashear worked for Charles Morgan. Brashear City became the most important commercial center within the study area.

Morgan was not the only person to operate Gulf steamers out of Brashear City. In 1857, Cornelius Vanderbilt, also, entered the Gulf steamer trade providing connections with the New Orleans, Opelousas, and Great Western Railroad Company terminus at Brashear City. Soon his 945-ton *Galveston* and the *Opelousas* were steaming from the railhead near Brashear City to Galveston. Another Vanderbilt steamer, the 494-ton *Suwanee,* was making the trip from New Orleans to Galveston, in direct competition with the Morgan steamers, driving the fare as low as $10 for cabin passage. The bidding for the Texas mail contracts, up for renewal in 1858, became quite spirited and complex, but in 1858 Morgan and Vanderbilt settled their business differences and Vanderbilt withdrew from the Gulf trade, selling his boats (with the exception of the *Opelousas*, which had sunk after colliding with the *Galveston* in November 1857) to the Southern Steamship Company. Morgan promptly renegotiated Vanderbilt's contract with the railroad company, agreeing to run two steamers a week from Berwick Bay to Indianola via Galveston and one per week to Galveston via Sabine Pass (Pearson and Simmons 1995).

To facilitate his Brashear City operations, Charles Morgan had acquired river front property in New Orleans on Girod Street near the Julia Street wharf, where his steamers landed when they did sail to New Orleans. In 1867, the tracks of the Pontchartrain Railroad, leading from the shores of Lake Pontchartrain, had been extended up the river to a new depot adjoining Morgan's property on the Mississippi. This provided Morgan with a connection from the Mississippi River to Mobile via the railroad and steamers which he owned that operated on Lake Pontchartrain. These lake steamers served the North Shore of Lake Pontchartrain and the Gulf coast to points as far east as Mobile (Pearson and Simmons 1995). In 1871 Morgan fitted out three vessels to serve as railroad car ferries on the Mississippi river, the *Porter, Lucretia,* and *Sarah.* These three boats had ramps and turntables and could carry up to 10 fully loaded train cars and could carry 260 cars daily (Baughman 1962:181, 204).

Morgan also improved his railroad between New Orleans and Brashear City. Using large numbers of Chinese laborers, he improved and elevated the grade and constructed new bridges. By 1871, Morgan's Louisiana and Texas Railroad was operating 14 locomotives, 10 passenger cars, 8 baggage and mail cars, 229 freight cars, and 8 service cars along its 80-mi route (Baughman 1962:185).

Initially, the entrance up the Atchafalaya River to Brashear City allowed only shallow-draft vessels, but in 1871 Morgan initiated the dredging of a ship channel from the Gulf through the lower Atchafalaya River in order to facilitate his steamship line. This channel, known as "Morgan's Ditch," was 6 mi long, over 100 ft wide, and 10 ft deep (Figure 3-14). Soon Morgan began to operate almost all of his Texas coastal steamers out of Brashear City rather than New Orleans.

In late 1871, Charles Morgan gave up his New Orleans to Mobile steamship service and thereafter concentrated his Gulf activities toward the Texas coast. By 1873, 17 Morgan Line vessels were calling at Brashear City, and Congress made it a Port of Entry. In the same year, the Louisiana legislature, in recognition of the tremendous importance of Charles Morgan's endeavors, changed the name of Brashear City to Morgan City (Goodwin et al. 1984:33). By 1876, the Morgan Line had 15 first class steamers in service between Morgan City and the Texas ports: the *Agnes*, the *City of Norfolk*, the *Alabama*, the *I.C. Harris*, the *Harlan*, the *Morgan*, the *Austin*, the *Clinton*, the *St. Mary*, the *Josephine*, the *Mary*, the *William G. Hewes*, the *A.C. Hutchinson* (1435 tons, built in 1870), the *Whitney* (1338 tons, 1871), and the *Gussie* (998 tons, 1872). On all these routes, the Morgan Line steamers provided the only regularly scheduled service (Baughman 1968:179-180).

Detailed information on the activities of one Morgan Line steamer, the *Mary*, is provided in Pearson and Simmons (1995). The *Mary* was typical of the Morgan Line steamers traveling in and out of Morgan City in the years following the Civil War and a

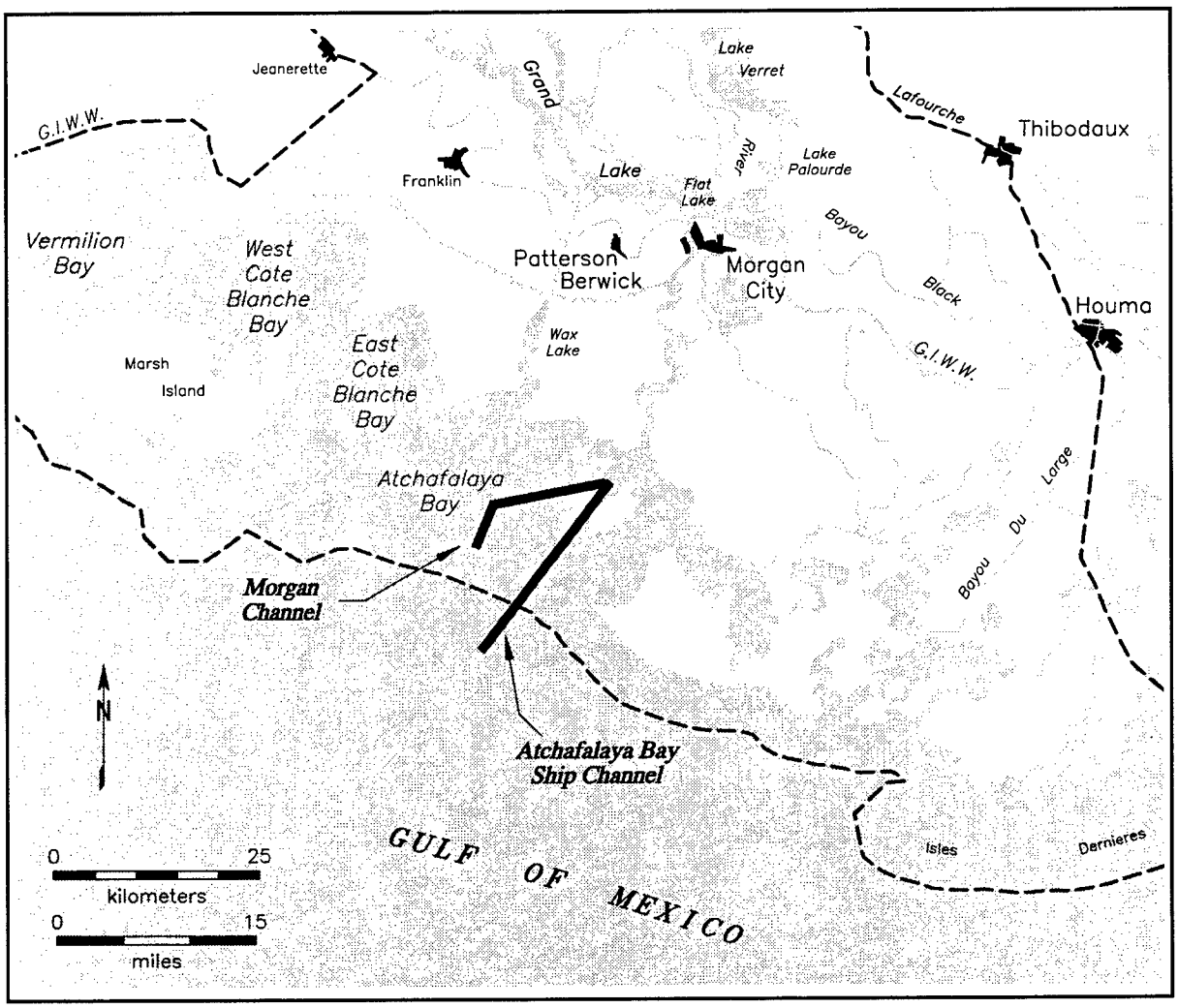


Figure 3-14. The locations of the modern Atchfalaya Bay Ship Channel and the old Morgan channel ("Morgan's Ditch") leading into Atchafalaya Bay.

brief examination of her activities provides a picture of the general pattern of trade for these vessels. The economic impact of the Morgan Line to Morgan City and the surrounding area was considerable, and the activities of the line must be considered in any discussion of the history of the region.

The *Mary* was an iron-hulled, sidewheel steamer powered by a single cylinder, low pressure, walking beam engine (Figure 3-15). The *Mary* was built for Charles Morgan's Gulf trade in 1866 by the Harlan & Hollingsworth Company at their shipyard in Wilmington, Delaware. She measured 234.1 ft long, had a beam of 33.2 ft and a depth of 9.6 ft. Her burden was 1096.48 tons. The *Mary* was designed to carry passengers as well as cargo (Pearson and Simmons 1996:62). The sailing schedules and the cargoes of the *Mary* and other Morgan Line vessels sailing from Louisiana to Texas were listed in various New Orleans newspapers, even though the vessels normally sailed from Morgan City, not New Orleans. The *Mary* is first mentioned sailing out of Morgan City (then still Brashear City) in the New Orleans *Daily Picayune* on March 27, 1872. She is advertised as bound for Rockport, Fulton, St. Mary's, and Corpus Christi, all towns on the lower Texas coast (*The Daily Picayune* March 27, 1872, in Pearson and Simmons 1995). The *Mary* continued in the Texas trade until November 30, 1876, when she sank at Aransas Pass, Texas.

The *Mary's* usual point of departure was Brashear City, later to become Morgan City. Occasionally, the newspapers report that the steamship departed

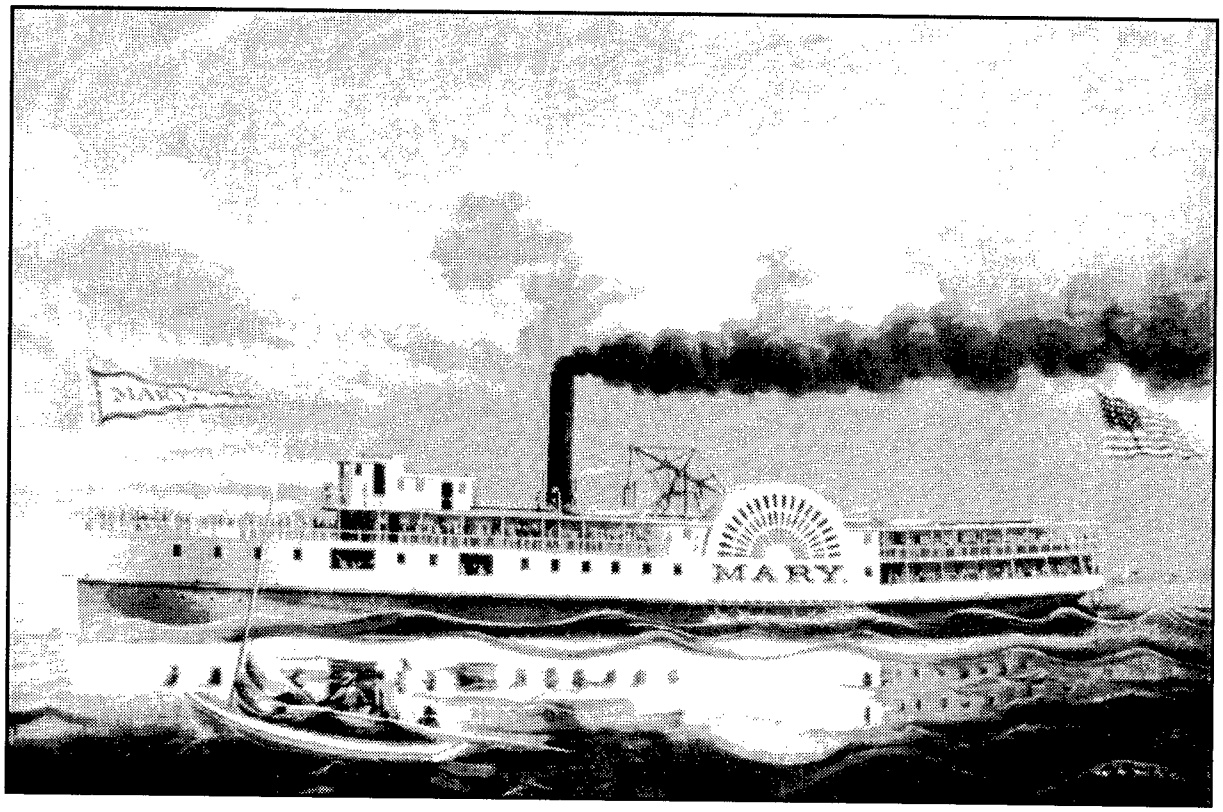


Figure 3-15. 1866 painting of the Morgan Line steamer *Mary* (Pearson and Simmons (1995:64).

via the Mississippi River, indicating she left from New Orleans, probably from Morgan's ferry landing in the city. The goods that the *Mary* carried out of Morgan City to Texas consisted largely of manufactured material and foodstuff, plus passengers. The cargoes carried from Texas into Morgan City consisted of the produce of the Texas coast, primarily cotton, cattle and cattle products. For example, on October 16, 1872, the "Marine News" section of the *Daily Picayune* noted that the *Mary* arrived in Brashear City with the following:

Cargo	Consignee
42 bales cotton	Francke and Danneel.
17 bales cotton	Beadles, Wood and Co.
17 bales cotton	E Pilsbury.
13 bales cotton	T and S Henderson.
10 bales cotton	W Morrison and Co.
9 bales cotton	Alous, Scherck, and Autey.
6 bales cotton	Schmidt and Ziegler.
4 bales cotton	Perkins, Swenson and Co.
4 bales cotton	L H Gardner and Co.
6 bales hides, 1 bale kips	C A Whitney and Co.
187 head cattle	C Mehle and Co.

The individuals and firms receiving these shipments were New Orleans factors, commission merchants, and businessmen who commonly received goods carried by the Morgan boats. The primary recipient of shipments from Texas on the *Mary* was C.A. Whitney and Company, headed by Charles Whitney. Whitney, one of Charles Morgan's sons-in-law, was also the operating agent for Morgan's Gulf trade steamships. The hides consisted of cattle hides and the "kips" refer to the hides of young animals (Pearson and Simmons 1995:94).

This cargo was unloaded in Brashear City and then shipped east to New Orleans on Morgan's Louisiana and Texas Railroad. A new cargo and passengers were loaded aboard the *Mary* and she left for another voyage on October 19, again sailing for the lower Texas coast. She returned to Brashear on October 28 carrying, what was for her, a rather unusual cargo. The cargo consisted entirely of specie as reported in the *Daily Picayune* (October 28, 1872):

Cargo	Consignee
$30,000 in specie	C A Whitney and Co.
$9,075 in specie	A Palacio.

$12,000 in specie	L B Cain.
$1,000 in specie	E J Forstall and Sons.
$1,000 in specie	Kern and Fellman.
$6,500 in specie	Generelly and Aleix.
$600 in specie	C J Leveque.
$500 in specie	Seig and Krug.
and others	

(Total specie carried = $60,675.00 listed + "and others?")

This cargo of specie apparently represented income or payments to these merchants that was being transported to New Orleans or represented funds from local Texas merchants being sent to banks in the city. On her next voyage the *Mary* returned to Brashear City with what was a much more typical cargo. Arriving in Brashear on November 6, she had on board:

> 47 bbls. tallow, 159 hhds. tallow, 36 tcs. beef, 3 bbls. oil, 200 sks. [sacks] wool, 3 bales hides, 27 bdls. hides for C A Whitney and Co; 1712 dry hides for E Pilsbury; and 356 head cattle for C Mehle and Co [*The Daily Picayune* November 6, 1872, in Pearson and Simmons 1995:96].

The shipment of processed beef and large numbers of live cattle such as in this cargo became typical for the *Mary* and the other Morgan Line steamers. The processed beef came from the several packeries and canneries that had sprung up on the lower Texas coast with the growth of the Texas cattle industry. The live cattle were held in pens in the hold of the ship during the voyage. Travel aboard the *Mary* probably could have been an unpleasant experience, with the noise and stench generated by 356 head of half wild, Texas-range cattle packed into a small space. Most passenger traffic, however, represented emigrants going to Texas; a lot fewer were traveling with the cattle back to Louisiana.

In 1876, her final year of operation, the *Daily Picayune* listed 33 voyages for the *Mary* and published 31 cargo manifests for her. In terms of the number of voyages per month, the *Mary* made three voyages each in January and February; two each in March and April; none in May; three in June; four each in July, August, and September; three each in October and November. Unlike earlier years, she seems to have been kept in heavy service during the early summer months of 1876.

The 31 cargo manifests extant for 1876 cover all but two of the *Mary's* voyages, and they provide the most complete yearly cargo information available for her. During the year, hides, live cattle, "skins," and wool were the most commonly carried items. Other cargoes carried included tallow, processed beef, specie, sheep, turtles and currency, mules and gold, horses, silver, pigs of lead, beef tongues, and hair. Other items carried during the year were: beef hams, lard, cotton, oats, and [scrap?] metal. Hides, skins, and cattle were carried every month the *Mary* sailed, and during March, July, August, and September, more than 1000 cattle per month were shipped.

The *Mary* carried cotton during only one month in 1876, September. Cotton shipments tended to be high from about September through December, as this was the time just after the crop had been picked and prepared for shipment. The 573 bales the *Mary* carried in 1876 represented about 260,000 lbs of cotton. When one considers that the *Mary* was only one of a dozen or so Morgan Line steamers in service, the importance of the Gulf trade coming in and out of Morgan City can be realized.

The Morgan Line steamers were not the only vessels to sail in and out of Morgan City from the Gulf. For example, in 1888, the Annual Report of the Chief of Engineers reported that the shipping activity at Morgan City included: "...two Morgan Line Steam-ships, one running to Texas ports about once in ten days, and one to Mexico once in two weeks; 25 schooners, and 30 luggers and sloops passing in and out an unknown number of times" (CE 1889:1510). Many of the sloops and schooners would have been involved in what was generally known as the "coasting trade." The smaller of these vessels sailed between ports on the Gulf of Mexico carrying local produce and some passengers. The larger schooners may have been sailing to foreign ports, or to American ports on the Atlantic coast. The luggers would have been involved, primarily, in local fishing and/or oystering activities, although a few also carried other cargoes to local towns and communities.

Typical of the coasting schooners operating in the study area were the *Thistle*, built in 1864 at Mobile, Alabama, and the *Lizzie Haas*, built at Madisonville, Louisiana, in 1882. The *Thistle* was a two-masted schooner of 52 33/100 tons burden. She was 73.1 ft long, 21.2 ft in breadth and had a depth of 5.7 ft.(BMIN 1865). Over the course of her existence the *Thistle* was owned by individuals in Mobile, Galveston and New Orleans and would have been sailing to these and other ports along the Gulf coast. On October 25, 1877, the *Thistle* was stranded on the west end

of Timbalier Island at 3 AM. The vessel had been run ashore in high winds and very heavy seas. She was a total lost and valued at $25,000 (WPA 1938:318).

The *Lizzie Haas*, named after the owner, Mrs. Lizzie Haas of Madisonville, Louisiana, was constructed at that town in 1882 and enrolled at the port of New Orleans on July 6, 1882, with John R. Haas as master. She was rated with a burden of 26.62 tons and measured 59.2 ft long, 21.5 ft wide, and had a depth of 4.3 ft. The schooner had one deck and two masts with a plain head and a square stern (BMIN 1882). The *Lizzie Haas* remained in the coasting trade under a variety of owners for 20 years. On a voyage on December 11, 1902, from Bayou Grand Caillou to New Orleans, she foundered in a heavy gale on Wine Island, very likely within the study area. She dragged her anchors, but was unable to save herself from sinking. The schooner was considered a total lost, valued at $2,500 (WPA 1938:210).

Like these two vessels, many of the sloops and schooners operating in the study area were built locally or at yards in Mississippi, Alabama, or the north shore of Lake Pontchartrain in Louisiana (Pearson and Saltus 1996). These vessels tended to be fairly small and had a shallow draft, specifically designed to operate in the shallow coastal waters and to carry the bulk merchandise that made up much of their cargo. For example, many of the coastal vessels hauling timber (i.e., masts, spars, and milled lumber) often had special hatches for loading and off-loading these cargoes.

The "lugger" was another regional sailing vessel used extensively in the coastal lakes, bays, and streams and in the shallow waters of the Gulf of Mexico (Chapelle 1951:282). The term lugger was used in earlier periods, but the vessel apparently became common only in the last half of the nineteenth century. The early luggers had slightly rounded bottoms and employed center boards. They ranged in size from about 18 to 45 ft in length. The rig was a "dipping lugsail," considered an unusual rig for an American boat (Chapelle 1951:284). These vessels were workboats used in oystering and shrimp fishing in the shallow coastal lakes, marshes, and streams throughout all of south Louisiana. Great numbers of luggers plied the waterways of the lower Atchafalaya Basin and the adjacent marsh and lake waters, but their day-to-day activity is not well known because they are rarely mentioned in contemporary documents.

The gasoline, internal combustion engine was invented in the late 1860s and began to come into general use in the last two decades of the nineteenth century. It was quickly adopted for use in boats, replacing the steam engine in part because it was less complex and easier to learn to operate as well as maintain. In addition, gasoline engines took up less space than steam engines and their boilers, a critical concern on boats, particularly small ones. Another factor which led to the increasing use of gasoline over steam engines on small boats is that they were lighter, thus "Gas boats . . . could go literally anywhere in low water, places that steamboats could not reach" (Custer 1994:17). By 1900, gasoline engines made by a variety of manufactures were being widely used in boats throughout the United States. Naphtha, another distillate of petroleum, also, was used to power early internal combustion engines. In fact, some early engines could be run on both naphtha and gasoline. Many of these boats were small, propeller-driven or sternwheel boats, but great numbers of larger sternwheel "gas boats" worked on the nation's principal rivers, alongside steamboats, carrying passengers and cargoes and working as towboats (Custer 1994:17, 26).

Within the study area, gasoline and naptha engines were quickly adapted to use in small boats, such as skiffs, bateaus and luggers. Many of these early engines contained only a single cylinder and were known as "one-lungers," although multiple cylinder motors were made. In the Atchafalaya Basin area, gasoline engines seem to have been used principally to drive propellers in small boats such as skiffs and bateaus. Pearson and Saltus (1991) report on several examples of early nineteenth century, propeller-driven skiffs (*esquifs*) which they discovered along the banks of Bayou Shaffer, just south of Morgan City. These "folk" craft were built of cypress, had flat bottoms and pointed (sharp) bows, and slightly narrowed, transom sterns. The ranged from 16 ft to almost 19 ft long and from 4.2 to about 5 ft wide. These small boats probably typify the huge number of gasoline-powered wood skiffs used throughout the study area from the 1890s to about 1950.

Gasoline engines, also, were used to drive sternwheel-powered boats and these were particularly adapted to the shallow water conditions found in much of the study area. The boat hull itself could be shallow and flat bottomed and the paddlewheel needed only to enter the water a small distance to drive the boat. A stern paddlewheel was particu-

larly useful on streams that contained numerous snags, logs and other obstructions that could damage a propeller. Because many early gasoline engines were built to operate at relatively low revolutions per minute, a simple gear reduction using a chain drive made them amenable to driving paddlewheels, which could operate only at low revolutions. Custer (1994) and Way and Rutter (1990) both note that gas-powered sternwheelers were fairly common during the period from 1910 to about 1920, however, relatively little is known about them, particularly their early history. While little is known about the use of sternwheel gas boats in the study area, the Annual Reports of the Chief of Engineers for the early decades of the twentieth century commonly mention "gas boats" working in the area. Many of these vessels are presumed to have been chain-driven sternwheelers. Although sternwheel gas boats continued in commercial use into the 1950s, most had been replaced years earlier by propeller-driven inboards or by outboard motors.

Diesel engines did not come into prominence until the 1920s and these began to replace the gasoline engines on larger boats, but were rarely used on small craft. The gasoline outboard motor, ultimately, replaced the inboard engine on small boats in the study area.

Boat building has been important in the study area since the early years of the nineteenth century, particularly as it relates to smaller boats, such as those commonly referred to as "folk craft" (Pearson and Saltus 1991). It can be assumed that almost all of these folk craft were built locally. However, some larger boats, also, were constructed, such as the 58-ft keelboat *Scorpion*, built on Bayou Teche in 1816; the keelboat *Mary*, built on Bayou Fusilier in 1819; and the steamboats *Osprey* and *G.W. Anderson* built at Franklin, Louisiana, in 1855 and 1881 respectively. This *Osprey* is very likely the steamer captured and burned near Grand Lake by Captain George Wiggin of the Federal gunboat *Kinsman* on November 7, 1862 (Pearson and Stansbury 2000:35). One of the largest ship builders in the study area was the Union Bridge and Construction Company which fabricated large, ocean-going wooden tankers at Morgan City during World War I (Pearson and Simmons 1995). The Union Bridge and Construction Company was one of almost 200 private shipyards around the United States that were contracted by the Emergency Fleet Corporation to construct ships during the war (United States Department of Commerce 1918:10; United States Shipping Board 1918:127). The Emergency Fleet Corporation was established early in the war as a branch of the United States Shipping Board specifically to help expand the United States merchant marine fleet through developing designs and placing contracts for ship construction as well as by commandeering vessels already built. Several of these yards were located in Louisiana and Texas. In Louisiana these included the Jahncke Shipbuilding Company in Madisonville, the Merrill-Stevens Shipbuilding Corporation in Slidell, and the Doullut & Williams Shipbuilding Company in New Orleans, as well as the Union Bridge and Construction Company in Morgan City. Texas yards included the Universal Shipbuilding Company in Houston, the McBride & Law Company and the Lone Star Shipbuilding Company in Beaumont, the J.M. McCammon and the Southern Dry Dock & Shipbuilding Company in Orange, and the Heldenfels Brothers Company in Rockport (United States Shipping Board 1918:127).

In May 1917, the Union Bridge and Construction Company purchased land along Bayou Boeuf in Morgan City to establish a shipyard. The company already had a presence in Morgan City, having been involved in the recent construction of the Southern Pacific Railroad bridge over the Atchafalaya River (*Morgan City Outlook* 1917). The Union Bridge and Construction Company began to build ships in their new yard under government contract. They completed four wooden ships and had three under construction when World War I ended and their contracts were canceled. They also were contracted to build three "wood ship barges" with a combined tonnage of 7,500 tons, which appear to have never been built. The four ships launched by the company were known as "Ferris" type ships. The Ferris style of ship was a wooden-hulled vessel with a single deck and a single superstructure "island" located near the center of the craft. One of these Ferris ships was the *Utina*, shown on the Union Bridge and Construction Company ways in Figure 3-16. She was designed as a steam-powered, propeller-driven freighter, measuring 267.3 ft in length, 46.0 ft in breadth, and 23.6 ft in depth. Her gross tonnage was 2,551 tons, her net tonnage was 1,527 tons, and her intended horsepower was 1400. The *Utina* was to be manned by a crew of 40 and her official number was 218386. Like many of the Emergency Fleet ships, the *Utina* was "equipped with wireless apparatus" and her signal letters were LRSH (United States Department of Commerce 1918:10). The *Utina* was not completed when the war ended. The vessel was sold to private parties and converted into a container barge for hauling crude oil. In 1921, the *Utina*, was driven by a storm

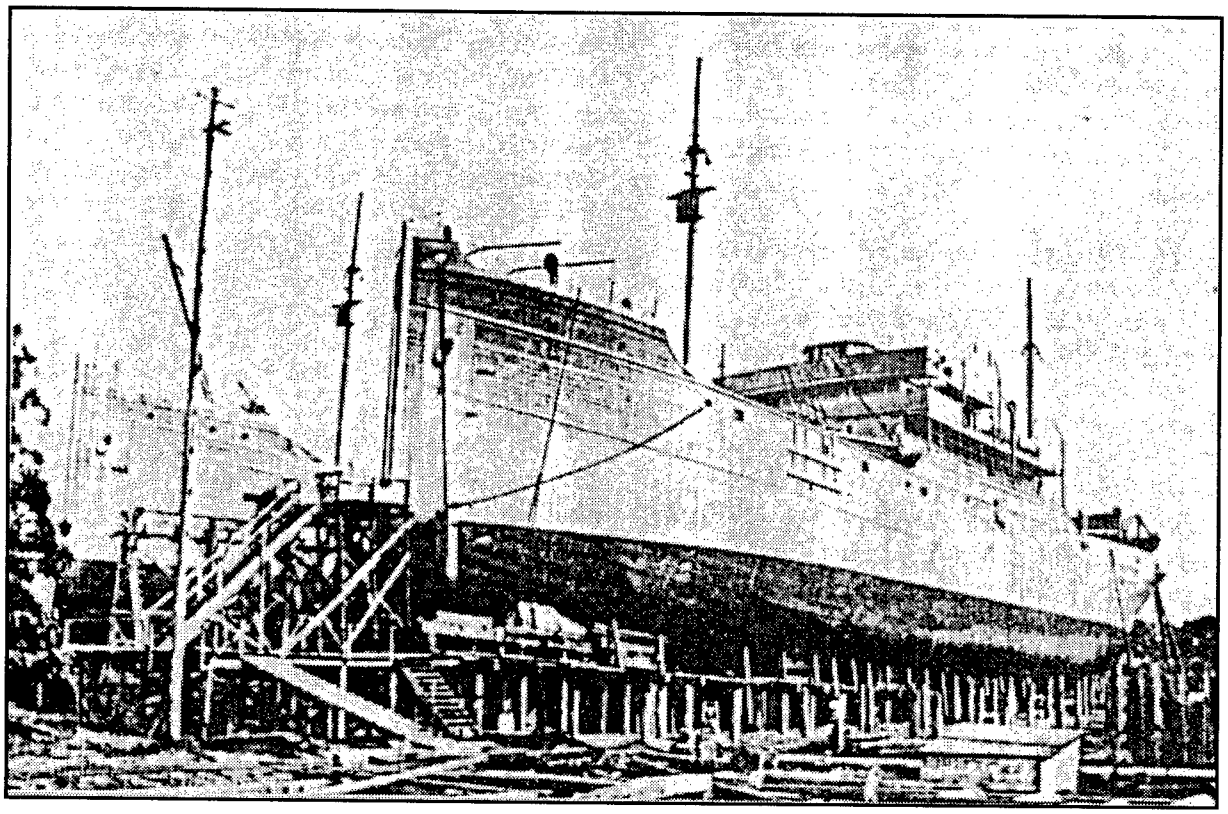


Figure 3-16. Circa 1919 photograph of the *Utina* on the shipways of the Union Bridge and Construction Company at Morgan City (photograph courtesy of the Morgan City Archives).

onto the rock jetty at Aransas Pass, Texas, and lost (Pearson and Simmons 1995). The Union Bridge and Construction Company, apparently, ceased operations in Morgan City not long after World War I.

Navigation in the Modern Era, Post 1936

In the period after 1919, diesel engines and screw propellers began replacing steam engines and paddlewheels on the commercial vessels using the study area. That development brought several types of towboats into use in the 1930s: steam-powered sternwheelers, steam-powered screw-propeller boats, diesel-powered sternwheel boats, and diesel- powered screw-propeller boats. On the Mississippi River, the steam-powered sternwheelers moved huge tows of barges, but the waterways of the study area permitted relatively small tows to be moved safely.

Steam-powered sternwheelers could guide huge tows if assisted by down river current, then return upstream without any cargo. The increase in traffic in such products as petroleum, scrap, fluorspar, and sulphur, required a towboat more powerful than those previously available. Designers found that diesel-driven screw propellers were more fuel-efficient than steam and diesel sternwheelers and could more successfully push boats upstream. During the 1930s, diesel-powered towboats with screw propellers became the variety most widely used.

Since the 1930s, commercial traffic in the interior of the Atchafalaya Basin has been confined primarily to the navigation channels built or maintained by the Corps of Engineers. The most important of these are the Gulf Intracoastal Waterway (GIWW), the Atchafalaya Main Channel and the Houma Navigation Channel. The smaller waterways of the region continue to be used by large numbers of fisherman, hunters and trappers using small boats both for commercial and recreational purposes.

By 1940, much of the commercial traffic on the inland waterways of the study area consisted of towboats with barges. Three types of barges became popular: open-deck, hopper, and tank barges. Open-deck barges carried coal, sulfur, pipe, processed steel, scrap iron, sand, and gravel. Their dimensions var-

ied from 100 by 26 by 8 ft to 135 by 30 by 8 ft and were capable of carrying 300 to 600 tons. On these barges the load was piled above the water level so that its base lay even with the vessel's upper edges, allowing water to spill onto the load.

Unlike the open-deck barges, the hopper barges carried cargo below covered decks beneath the water's surface. They typically measured 175 by 26 by 11 ft. The largest hopper barges measured "300 by 52 by 12ft." Tanker barges transported petroleum products, vegetable oils, acids, molasses, and tar products. Their size ranged up to 195 by 35 by 10 ft with a carrying capacity of 300 to 1,200 tons.

By the 1980s, towboats were being built with 7,000 to 10,000 horsepower and, on the Mississippi River, could move as many as forty barges weighing 50,000 tons. Smaller towboats of the type most typically used in the study area, with engines under 2,000 horsepower capacity typically measure 90 by 27 ft with a 7.37-ft draft. As in the 1930s, diesel engines continue to be the standard power units in towboats. Today the "integrated" tow is the common arrangement for barges being moved by towboats. In this type of tow the barges with sloped bows and square sterns are placed in front of barges squared at the bow and stern. The integrated tows perform better than non-integrated tows. They are most advantageously used on long-distance through trips.

Navigation Improvements and Navigation Routes in the Study Area

The Atchafalaya River represents the largest north-south waterway between Bayou Teche to the west and the Mississippi River to the east. Historically, the upper end of the Atchafalaya was connected to both the Mississippi River and to the Red River, and both provided the bulk of the flow which made up the Atchafalaya. However, during the early years of the nineteenth century, the head of the Atchafalaya River, just below its departure from the Mississippi River, had been constantly blocked by log jams and rafts, impeding transportation. In 1833, the Louisiana legislature authorized funding of a state engineer and that office's first task was the removal of the rafts obstructing the Atchafalaya and Grand rivers and Bayou Sorrel in order to open navigation through to the Attakapas region (Switzer 1889:258). Removal of the rafts began in 1839 and, by 1855, the channel was eventually cleared. This caused a dramatic increase in the size and flow of the Atchafalaya channel. By then, the Mississippi River had begun to meander to the southeast near its juncture with the Atchafalaya, causing silting and difficulties in maintaining an open channel to the Mississippi.

Public improvements by the state were confined mainly to removal of rafts, dredging channels and removing snags, and construction of canals between navigable rivers. In 1846, the State purchased a snagboat and a dredge and had 114 men working on crews. Work had been done to clear Bayou Plaquemine to the Mississippi River and to remove snags and obstructions from Bayous Bartholomew, Des Glaises and Courtableau (Switzer 1889:259).

These projects initiated major endeavors to improve and enhance navigation within the study area, which have continued to this day. Some efforts to improve navigation routes in the study area had been conducted at an earlier date, such as the removal of obstructions in Bayou Plaquemine as early as the 1770s, but major attempts at these improvements really began with state involvement in the 1830s. By the late 1870s, the Federal government had largely taken over these public work activities. The following sections present discussions of navigation improvements conducted within the study area, particularly as they occurred after the involvement of the Federal government. Specific discussions are provided on the principal navigation routes in the study area and information pertinent to the present study, such as where wrecks were encountered and/or removed, is presented.

As noted, the state of Louisiana had a large role to play in these public works programs during the first three-quarters of the nineteenth century. In Louisiana, during the period prior to 1849, drainage and levee construction was undertaken by private individuals (riparian holders) and local municipalities. From 1849 to 1879 much of the work in flood control was under state management up until the creation of the Mississippi River Commission. From that point until the present, flood control and navigation improvements in the lower Mississippi River region has primarily been under federal control and management.

Prior to the involvement of the Federal government, internal improvements in Louisiana were undertaken by two separate departments, headed by the State Engineer and the Board of Swamp Land Commissioners. In a special report to the state legisla-

ture in 1857, the State Engineer, Louis Hebert summarized the two departments roles:

> The first have under their control the reclamation and drainage of the swamp and overflowed lands donated to the State of Louisiana by the United States; and for this purpose have in use such portions of the funds accruing from the sale of said lands as may be yearly appropriated by the Legislature. The State Engineer has in charge the improvements for navigation purposes, of all the streams of the State and the construction of public roads for land transportation. The means at his command are the snag boats of the State, ninety-four slaves, and such sums as the Legislature appropriates yearly to his Department [Harrison 1948:23-24].

The Swamp Land Commissioners had been established in 1849 and 1850 when legislation known as the Swamp Land Acts were passed. These Acts dealt mainly with the disposition of the vast amount of swamp lands in public ownership. One of the outcomes from initiating the Acts were studies performed to collect data for Legislative committees. Among the most famous studies in the lower Mississippi River area was the Delta Survey by Captain A. Humphreys and Henry L. Abbot. which began in 1851 and was funded by the U.S. Congress. One of the earliest and best examples of a State study was the report on the flood and drainage problems in Louisiana by State Engineer, A.D. Wooldridge in 1850. He noted in his findings that, in regards to both flood control and navigation, the state's attention should first "be directed to the present natural outlets. These are the Atchafalaya, Plaquemine and Lafourche. The Atchafalaya should be regarded as the great natural drain of Southern Louisiana" (Harrison 1948:24-29). Wooldridge went on to note that the state should develop an overall plan for treating navigation and flood control and not leave these activities to individual parishes, as had often been done in the past.

A legislative committee collected the data from the Wooldridge report and others concerning flood control and navigation, but found the available data inadequate to make a decision on how best to handle the problems. To gather first hand information, the committee arranged a series of trips in July 1850 on board the steamboat *Creole*. Many important individuals made the trips; State Supreme Court Judges, distinguished planters, engineers and surveyors and members of the Legislature. Trips were made to selected trouble spots where surveys, soundings and measurements were taken, so that detailed investigative reports could be prepared. The Committee, also, asked professionals in the fields of topography and hydrology to make observations and prepare reports. In addition, a series of public hearings were held, so that private citizens could express their opinions. The Committee believed that levee construction was "State work" and should be under the control of a state official. The establishment of levee districts was also recommended as a way to administer the levee programs. It also became clear to the Committee that front proprietors could no longer build levees of adequate size. There had to be a system to distribute the cost of flood control "in proportion to the value of the lands." The Committee made several suggestions; clear the obstructions in Bayou Lafourche, clear the Atchafalaya from its source to the Gulf and make outlets in the Mississippi River at Mt. Morganza, Plaquemine, Bonnet Carre, near Raccourci Cut-off and possibly at Fausse River. By the Amending Act 328 of 1853 the state was divided into four levee districts, the Atchafalaya area being in the Second District (Harrison 1948:30-35).

The initial work planned for the Atchafalaya River Valley was to enlarge the levees which were built by front holders. The lands of the valley were fertile and the Swamp Land Commissioners were pressured to make the land safe from floods, as well as to drain areas to make more lands available for cultivation. If there were gaps in the levee, they would be closed. Streams to the east and west of the river, Caswell, Neuman's, Lattania, Sherman's, Baylock's, Prim, Cross, Latenache, Warden's and Garwoods, were to be closed. When it was possible, the flow of these bayous was diverted south through a series of canals into Grand Lake. Where the streams were large and the levees not easily closed, a culvert with gates was used. These were designed to allow drainage, but to keep flood water from backing up and ponding water behind the levees of the Atchafalaya. The plan the Commissioners recommended was "(1) the removal of so much of the raft in Grand River and the two bayous Pigeon, as will give a good drainage channel into Grand Lake, (2) removal of drift and deepening of channels of Tensas and Lake Mongoulois into Lake Long, so that the pent up waters of the Atchafalaya may find free vent through that western channel to Lake Fausse Pointe" (Harrison 1948:37-39). Although a major concern of the commissioners was flood control, navigation was also important and the projects undertaken were intended to aid one or both.

By 1856, the improvements made in the Atchafalaya Valley had deteriorated and needed repair. Many of the levees had been built too near the river and washed away. The culverts constructed in many bayous did not fair well either. The unstable foundations caused cracks and many settled unevenly, and some of the iron gates fell off their hinges from their own weight. The system of canals was not complete and water was ponding behind the levees and because a severe rain in August almost washed away two culverts and a portion of levee, it was decided to remove culverts close to mouths of bayous with heavy levees and divert waters south. Closure of Bayou Rouge was also considered, but because it was a navigable stream this idea became "inexpedient, impolitic, and unwise as well as unwarrantable, illegal and unconstitutional to close or in any manner obstruct the free navigation of the Bayou Rouge." The drainage and closure of Bayous Lafourche and Plaquemine were considered as well, and had become an important issue (Harrison 1948:46-48).

In March 1859, dissatisfaction with the Swamp Land Commissioners had finally reached the point that a reorganization took place and the Legislature created the Board of Public Works. The four swamp land districts became the Internal Improvement, Leveeing, Drainage and Reclamation Districts. They were similarly divided into two major departments; the Internal Improvement Department, which formerly functioned as the State Engineers Office and the Leveeing, Drainage and Reclaiming Department, which was formerly the Board of Swamp Land Commissioners. Under the Board of Public Works, detailed plans were to be submitted for approval to the General Assembly before work could begin. (Harrison 1948:81-83).

In 1877, Legislative Act 140 consolidated Reclamation Work under the direction of the Governor. The Office of the Governor performed the majority of the administrative work connected with building levees and drainage. The Act also provided "That the police juries of the several parishes of the State are hereby invested with the management and control of all public levees of the State, and are authorized and required to make such regulations as are necessary and proper for the repair and construction of levees within the limits of their respective parishes" (Harrison 1948:130).

There were many large crevasses along the Mississippi River, that would cost great sums of money to close. The State spent over $11 million between 1866 and 1879 on the construction of levees without achieving any great degree of flood protection. It was felt at the time that the only hope for success was with federal aid. A joint resolution of the Louisiana Legislature was passed in 1876 concerning the need and desire for federal aid for levee building. Subsequently, most flood control projects and navigation improvement activities were taken over by the Federal government through the U.S. Army Corps of Engineers and the Mississippi River Commission, formed in 1879. The Federal government had been involved in navigation improvements in Louisiana at a much earlier date. For example, in 1837 Congress allocated $285,000 to undertake dredging at the mouth of the Mississippi River (Lowrey 1964:238-239). But most of their work prior to the 1870s was confined to the Mississippi River. Much information on the Corps' activities related to navigation improvement can be found in the Annual Reports of the Chief of Engineers submitted to Congress. These Annual Reports have been drawn on extensively in the following discussions.

Atchafalaya River

The Atchafalaya River represents the largest waterway within the study area Prior to the twentieth century, the upper end of the Atchafalaya was connected to both the Mississippi River and the Red River, and together they provided the bulk of the flow which made up the Atchafalaya. In the early years of the nineteenth century, the head of the Atchafalaya River, just below its departure from the Mississippi, had been constantly blocked by a log raft, impeding transportation. The first effort to remove the raft began in 1839, and by 1855 the channel was eventually cleared. This caused a dramatic increase in the size and flow of the Atchafalaya channel. As a result, large quantities of sediment were carried into the Atchafalaya and the numerous streams in the Atchafalaya Basin increasing sediment rates, particularly in the upper part of the basin. As Castille et al. (1990) note, it was after the clearing of this raft that flooding and siltation problems began to occur at the community of Bayou Chene in the central basin.

By the time the raft was cleared, the Mississippi River had begun to meander to the southeast near its juncture with the Atchafalaya. This caused silting making it increasingly difficult to maintain an open channel between the two rivers. By 1875 it was necessary to maintain a man-made channel between the Mississippi and the Atchafalaya within the

lower arm of what was known as the Old River Loop. With the increase in flow down the Atchafalaya (due to raft removal), the Red River also diverted some of its flow in that direction. This, in turn, caused the silting of both the upper and the lower arms (Fisk 1952:22). To combat the silting of Upper Old River, a dam was built in 1891 to divert some of the Red River flow through the Upper Old River arm. This scheme failed, however, and by 1896 the dam was abandoned. The upper arm of the Old River loop then silted in completely (Fisk 1952:22).

With the closure of the Upper Old River arm, the lower arm took the major flow, and by the early 1900s, dredging to maintain the lower channel was not necessary (Fisk 1952:22). The majority of flow in the lower channel was, by 1940, coming not from the Red River, as it had previously, but from the Mississippi River. By 1949, revetments were necessary in the area to stabilize the bank lines (Fisk 1952:23). A navigation lock built in 1963 in conjunction with the Old River Control Structure at the head of the Atchafalaya allows boat traffic between the Mississippi and the Atchafalaya-Red Rivers.

In 1873-1874, a survey was conducted along the Atchafalaya River from the mouth of the Red River to Berwick Bay, a distance of about 138 mi. This survey revealed a relatively deep channel, averaging over 20 ft deep, but with shoals of 7 ft or less at Lake Mongoulois and Sunken Island. Many small but navigable channels entered the Atchafalaya along its length, although navigability in these feeder channels was often dependent upon water stage and rafting. At the time, many of these channels were plied by lumber-tugs and coal tows. Boatmen of lumber-tugs reportedly favored the first and seventh Tensas bayous as low water routes (CE 1875:773).

As has been discussed, the Atchafalaya River and other channels in the Atchafalaya Basin were important as transportation routes between the Teche region and the Mississippi River throughout the nineteenth century. This navigation network was permanently altered during the 1930s with the construction of the east and west guide levees and the Old River control structure which created the Atchafalaya Floodway (Clay 1983). With the construction of these levees, east-west travel through the basin was permanently obstructed except at a few locations (e.g., Bayou Plaquemine).

The lower Atchafalaya River from Berwick Bay to the Gulf was surveyed by the Corps of Engineers in 1888. The existing "Morgan's Cut" in Atchafalaya Bay (see Figure 3-14) was 9 ft deep and 120 ft wide. At that time, engineers were considering the construction of a second channel in the bay. During 1888, vessels using the Atchafalaya River included two Morgan Line steamers about which the Annual Report of that year noted:

> The Texas steamer draws about 8 feet and an increase of water at the mouth of Atchafalaya River would do them no good, as it could not be carried into the Texas ports visited; probably none of the sailing vessels draw as much as the steamers [CE 1889:1510-1511].

Although the Corps felt there was no need to deepen the channel in 1888, a new Atchafalaya Bay ship-channel was subsequently dredged through the bay and a shallow, known as Point aux Fer Reef, replacing the older Morgan Channel. When completed in 1911, the new channel was 20 ft deep and 200 ft wide (CE 1912:1989). The head of navigation for the 20 ft channel was Morgan City. With the completion of this channel, Morgan City was no longer restricted to ocean going vessels with 7 ft or less draft (CE 1914:780).

One of the navigation aids for the Atchafalaya was a lighthouse at the entrance of Atchafalaya Bay to aid ships coming in from the Gulf (CE 1880:1187). Originally located at Point au Fer, on the eastern side of the bay, the lighthouse was moved toward the center of the bay in the latter part of the nineteenth century. Remains of the original lighthouse, and several associated structures, are still extant at Point au Fer, although they have been impacted by erosion in recent years (Pearson 1992).

The maze of waterways within the Atchafalaya Basin also provided an important transportation route leading into and out of the Teche region. In order to avoid dangerous boat travel through the open Gulf, boats meandered through an elaborate system of interconnecting streams located between the Mississippi River and the Teche. During the 1880s, goods could be shipped from Bayou Teche to New Orleans on a newly completed 125-mi long railroad, or a 425-mi water route which followed:

> ...the Teche into the Atchafalaya, Grand Lake, Lake Chicot, Lake Mongoulois, bayous La Rompe or Little Tensas into the Grand or Atchafalaya river again, thence into the Mississippi, through Old River, to New Orleans...[CE 1885:1434].

According to the 1882 Annual Report of the Chief of Engineers, there were six established routes for steamboat navigation between the Atchafalaya and Lake Chicot (depending on water levels):

Route	Length
Little Atchafalaya, La Rompe, and Chene	19.4
Grand River, La Rompe, Devil Chute, and Chene	19.7
Grand River, Big Tensas, and Chene	21.5
Grand River, Little Tensas, and Chene	23.0
Grand River, Little Tensas, Rigarby, and Sorrel	24.3
Grand River, Little Tensas, Rigarby, and Jake	21.2

[CE 1882:1408].

Despite the cheaper rates for water transportation, late nineteenth century merchants preferred the faster rail route. East-west coastal water transportation did not effectively compete with the railroad until completion of the Gulf Intracoastal Waterway during the early twentieth century. Small channels such as Bayou La Rompe and Bayou Little Tensas were important for boat travel in the nineteenth century but were rarely utilized for commerce during the early twentieth century. By 1885, the Morgan Railroad accounted for 90 percent of the commerce between the Teche country and New Orleans. By that year, only one boat, the steamer *New Iberia,* made regular trips between Bayou Teche and New Orleans (CE 1885:1439).

Of interest to the present study, is the fact that wrecks are often mentioned in the nineteenth and early twentieth century Annual Reports. For example, as a result of the 1874 survey, at least five boat wrecks were identified along the Atchafalaya River: three coal barges in Lake Chicot, the steamboat *Queen of the West* near Miller's Point and the steamer *Thompson* near Cypress Island (CE 1874:774). The second survey conducted along the upper Atchafalaya in 1880-1881 indicated a relatively deep channel with some shoals reducing the depth to about 18 ft. A "steamboat graveyard" with three sunken steamers was reported at a sharp bend 31 mi below Simmesport, or about 2 mi below Melville (CE 1882:1397-1400). This location is out of the present study area. The wreck of the *Queen of the West* was reportedly completely removed in 1895 and the channel was restored to navigation at that point (CE 1896:1520). In 1901, a sunken coal barge was removed from the channel about 2 mi below the entrance of Bayou Pigeon (CE 1901:1897).

Grand Lake

As discussed in Chapter 2, Grand Lake represents one of the chain of water bodies along the lower Atchafalaya River. During the historic period, at least, it was the largest of the lakes in the basin, much larger than it is today. In 1883 it was 35 mi long and 10 mi wide at its widest part. A shoal was located where the Atchafalaya River intersects the upper end of Grand Lake. At extreme low water the depth over the shoal was only 3.5 ft (CE 1883:1131-1132).

Throughout the historic period, the Atchafalaya, and therefore Grand Lake, served as the major route for vessels traveling downstream to the lower Atchafalaya and Bayou Teche. The specific routes traveled through Grand Lake changed over time, as the natural channel of the river itself shifted within the lake. This water body was later included in the Gulf Intracoastal Waterway system between Morgan City and Plaquemine Lock.

The Gulf Intracoastal Waterway

Today the most heavily trafficked commercial waterway passing through the study area is the Gulf Intracoastal Waterway (GIWW). This waterway stretches along the Gulf coast, following natural and man-made channels, providing a protected route for boat and barge traffic. Construction of the inland waterway has occurred primarily in the twentieth century, but the idea for such a navigable route dates from the nineteenth century. In 1873, Congress appropriated funds to conduct a survey for the western portion of a inland waterway between the Atlantic Ocean to the Gulf of Mexico. The Rivers and Harbors Act of March 3, 1873, provided for a survey "connecting the inland waters along the margin of the Gulf of Mexico, from Donaldsonville, in Louisiana, to the Rio Grande river, in Texas, by cuts and canals." Captain Charles W. Howell of the Engineer Office in New Orleans directed the survey and delegated the field work to engineers H.C. Ripley and J.A. Hayward. Hayward began working westward from the Mississippi River at Donaldsonville and Ripley worked from Sabine Lake eastward. The two survey parties met midway between Vermilion Bay and White Lake. Howell noted in his survey report of 1875, that if commercial traffic were to justify development of an inland waterway, the initial entry point on the Mississippi should be below Donaldsonville. Howell also noted that the segment between Donaldsonville to Vermilion Bay had some

of the most fertile agricultural lands and timber stands in the state (Alperin 1983:21-23).

An event occurred on January 10, 1901, that would stimulate the development of an inland waterway along the coast. This event was the oil gusher at Spindletop, Texas, that ushered in the petroleum industry and, ultimately, the need to transport huge amounts of crude oil. Public support had grown for waterway improvements and for a "Louisiana and Texas Inland Waterway." More surveys were conducted in 1906. Major Jadwin, District Engineer at Galveston, examined the surveys and assessed the potential commerce to include coal, oil, rice, sugar, molasses, cotton, lumber and general merchandise. Jadwin thought the point where the inland waterway should join the Mississippi River was at the Plaquemine Lock, below Baton Rouge, which was under construction and completed later in 1909. The route would have advantages to Baton Rouge and access to the prairie lands of Opelousas, but offered little for the markets in New Orleans. A special board of engineers responsible for the entire Gulf coast waterway reported in 1914 that the inland canal and the Mississippi River should join as close to the business section of New Orleans as practicable. They recommended a juncture at Harvey, directly across from the business district of New Orleans. In 1919, Congress authorized the final segment of the Gulf waterway in Louisiana, a 5-ft-by-40-ft canal from the Mississippi River west through the Harvey Canal-Lake Salvador route to Bayou Teche. By 1922, 171,000 tons of cargo was being transported on existing channels, even though federal improvements had not been accomplished on all. Another survey was authorized in 1923, designating for study the area from the Mississippi River near New Orleans to Corpus Christi, Texas. Two issues were involved, the continuity of the canal and its dimensions (Alperin 1983:24-27).

The argument for increased dimensions for the inland waterway was based on the dimensions that prevailed on the Mississippi River from New Orleans to St. Louis and on the Ohio River to Pittsburgh. At the time a 9-ft-depth existed on the Ohio and Mississippi. Proponents for the inland waterway pushed for a comparable depth along the Gulf coast. On March 3, 1925, Congress appropriated funds for a 9-ft-by-100-ft intracoastal waterway. Additional authorizations in the National Defense Appropriation Act of 1942 funded work for a continuous waterway with dimensions of 12 by 125 ft. An alternate route from Port Allen, located on the Mississippi River opposite Baton Rouge, to Morgan City added a connecting channel to the system and offered a shorter course for traffic from the Upper Mississippi to the western portion of the waterway in Texas. This route incorporated the earlier Plaquemine to Morgan City waterway, but replaced the Plaquemine Lock with the larger Port Allen Lock (Alperin 1983:28-35).

Concerns over flooding led to plans for closing Bayou Plaquemine, but the demand for a convenient channel between the Mississippi River and the fishing and timber resources in the Atchafalaya Basin and the agricultural products on Bayou Teche kept this access open. The route through Bayou Plaquemine to Bayou Teche was 180 mi shorter than was the route via New Orleans. The greatest benefit of maintaining the navigability of Bayou Plaquemine would accrue to the planters on the Teche. The Teche was the richest sugar country in Louisiana with an estimated output of $3,385,000 for sugar and molasses. If this could be carried by a water route, produce could be transported for a lower freight rate than by railroads (CE 1887:1406). Congress appropriated funds in 1888 and 1889 for improvements to Bayou Plaquemine for channel clean-up and construction of the lock. Plans called for the lock chamber to be 265 ft long and 55 ft wide. The total lift of the lock was designed for 50 ft, to compensate for the difference between high and low water flood stages on the Mississippi. The Otis Elevator Company was contracted to design the powerhouse and to supply the operating machinery. The Penn Bridge Company completed the work on the lock. Construction had begun in 1895 and was completed in 1909. When the lock was completed, it was the largest structure of its type in the United States (Landry 1990:15-21). The opening of the lock justified establishment of a boat line between the Teche and New Orleans with rates lower than the railroad (CE 1912:657).

Bayou Plaquemine had become the northern terminus of the GIWW in 1925. It was the intermediate connection between the Mississippi River and the Gulf of Mexico through Bayou Plaquemine, Grand River, Bayou Grosse Tete and Bayou Sorrel. Small packet steamers carried people and cargoes between Morgan City and Plaquemine. But by the 1940s, larger vessel sizes and increased traffic required a wider channel. As a result, funds were allotted for a new lock to be constructed at Port Allen. Plaquemine Lock closed in September 1961, two months after the new lock at Port Allen began operation. This lock continues to provide access into the waterways of the Atchafalaya Basin (Landry 1990:21-26).

Bayou Black

During the 1830s, Bayou Black became part of an east-west route between Morgan City and New Orleans. This route utilized a series of natural water bodies and dug canals and it was particularly important for providing access to the town of Houma. In its natural state, Bayou Black was only considered navigable in high water and, even then, travel was hindered by stumps, logs and other obstructions. Prior to 1835, a variety of vessels used the bayou including keelboats, flatboats, sloops, skiffs, pirogues, and small steamboats. In 1835 and 1852, William Shaffer (who owned a plantation three miles upstream of Houma) constructed locks on Bayou Black to improve navigation. This was part of an agreement with the Barataria and Lafourche Canal Company that stipulated that if Shaffer built and maintained the locks he could collect a toll for each boat that traveled through them (Figure 3-17). The locks were large enough to accommodate steamboats, including Shaffer's boat the *Archer* and others, such as the *Houma,* with a length of 97 ft, the *Live Oak* at 112.7 ft, and the *Excel* at 97 ft (Castille 1993:250-255)

Although it was very shallow during the late-nineteenth century, Black Bayou was originally much deeper such that in 1860 steamboats could travel upstream as far as the town of Houma (CE 1885:1401). However, by 1881, logs clogged the channel as a result of the practice of clearing the banks and letting the trees fall into the bayou, where they accumulated (Becnel 1989:107). When first dredged in 1883, it was reported that Bayou Black was so shallow and clogged with debris that it was ". . . impossible to float the lightest skiff" (CE 1886:1261). Dredge work began at Tigerville (present-day Gibson) and moved upstream toward Houma. The dredged channel was 50 ft wide and 6 ft deep and extended to a point 14 mi below Houma. Major commercial crops along Bayou Black were sugar, molasses, corn, and rice (CE 1883:1120-1121), and after dredging, flatboat commerce increased on the bayou from Tigerville on down (CE 1885:1402).

Boat wrecks are reported in Bayou Black from the earliest years of improvements. In 1883, while dredging upstream from Tigerville, one steamboat and one flatboat wreck were removed in the first 5665 ft of channel (CE 1883:1120-1121). In 1913 ". . . the wreck of an old abandoned steamboat was broken up and removed from the channel" (CE 1914:792).

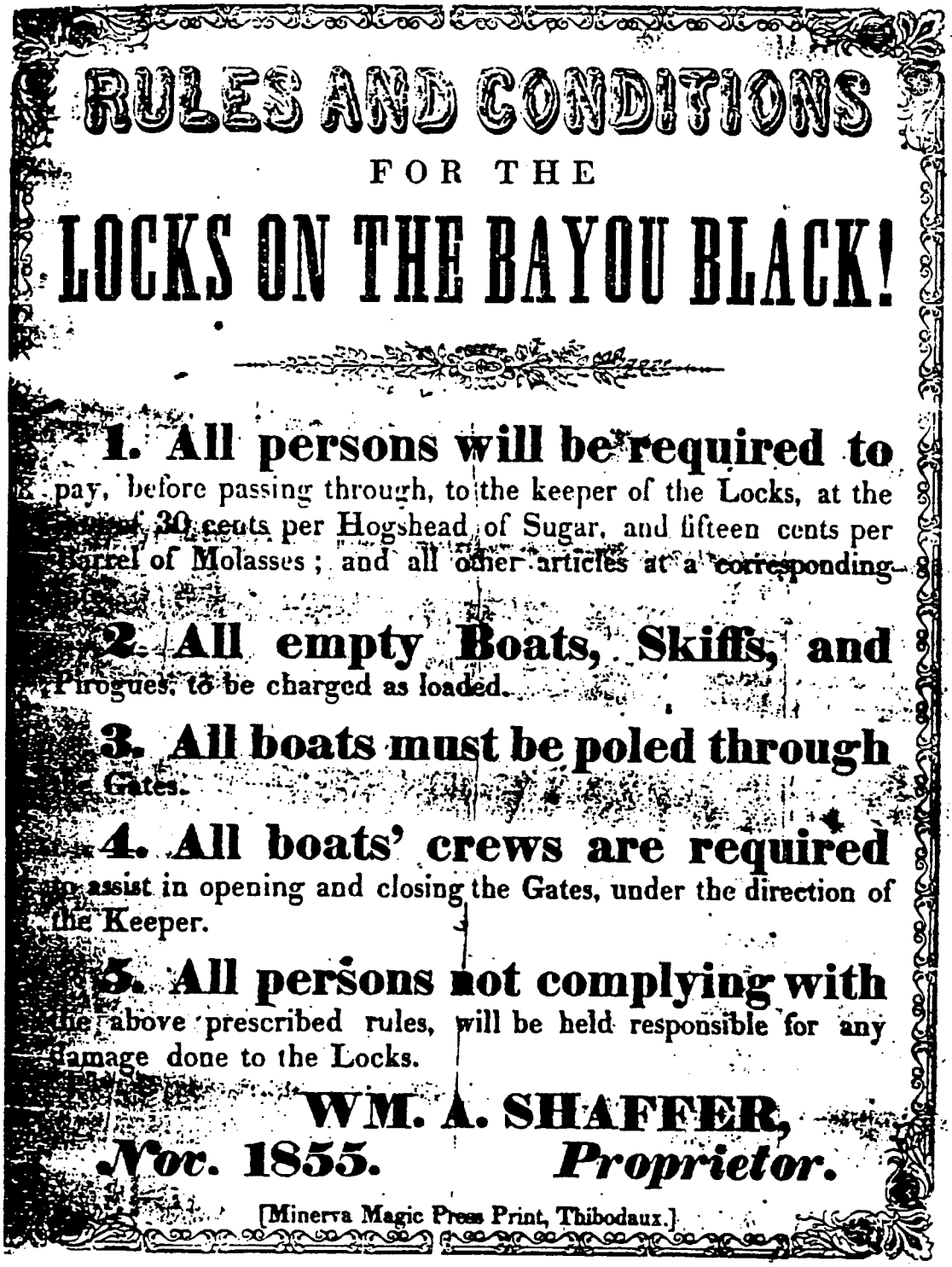
Eventually, the upper portions of Bayou Black became filled and overgrown, and little more than a ditch. Today, sections of the bayou above Houma have been extensively modified and navigation is prevented by a series of culverts and bridges (Castille 1993:256-260).

Bayou Des Glaises and Bayou Rouge

Bayous Des Glaises (often Glaizes) and Rouge unite at the junction between Cottonport and Longbridge. These two bayous are actually outside of the study area, but boat access to them was commonly through the study area such that a brief discussion of their navigation during the historic period is pertinent. *Glaise* is the French term for "marl," which is a mixture of clays and remnants of shell made up of carbonates of calcium and magnesium. The early French inhabitants applied the word to areas where animals would lick the salt from the earth (Read 1931:168).

An initial navigation survey was conducted along Bayous Des Glaises and Rouge in 1880. These channels were subject to water level fluctuations in Red River and during the 1880 survey it was noted that the low water stage left the channel almost completely dry, with pools in the center averaging only about one foot deep. Heavy local rains sometimes raised the water level enough "to allow small boats to run when they could not get from the Mississippi into the Red" (CE 1889:1512).

Even though they were small streams, they were locally important commercial water routes in the nineteenth century. A number of steamboats were serving Bayou des Glaises by the 1850s, and a few advertised specifically for the bayou. For example, an 1860 New Orleans newspaper advertisement for the steamboat *Flora Temple* noted the boat would leave "for Bayou De Glaize" via Plaquemine (Huber 1959:26). This 158-ft sidewheeler seems to have been rather large to travel on Bayou Des Glaises and may have made the trip only during high water. However, by 1880 Bayou Des Glaises had been all but abandoned for commerce and no boats were reported on the channel between 1874 and 1880 (CE 1880:1178). In that year, the lower end of Bayou Rouge was traveled by a single, small steamer which carried freight down to Melville (formerly Churchville) where it was transferred across the levee to larger steamers in the Atchafalaya River (CE 1880:1191). The Bayou Rouge channel was considered navigable only during high



RULES AND CONDITIONS

FOR THE

LOCKS ON THE BAYOU BLACK!

1. All persons will be required to pay, before passing through, to the keeper of the Locks, at the rate of 30 cents per Hogshead of Sugar, and fifteen cents per Barrel of Molasses; and all other articles at a corresponding rate.

2. All empty Boats, Skiffs, and Pirogues, to be charged as loaded.

3. All boats must be poled through the Gates.

4. All boats' crews are required to assist in opening and closing the Gates, under the direction of the Keeper.

5. All persons not complying with the above prescribed rules, will be held responsible for any damage done to the Locks.

WM. A. SHAFFER,

Nov. 1855. Proprietor.

[Minerva Magic Press Print, Thibodaux.]

Figure 3-17. 1855 rules and conditions for using the lock on Bayou Black (Castille 1993:253).

water when vessels could pass over the numerous obstructions (CE 1891:1855). The late-nineteenth century commerce on Bayou Rouge was principally cotton, and during high water small boats commonly traveled from the Atchafalaya River up to Enterprise Landing to pick it up (CE 1887:1395). By 1890, other local exports included cottonseed, sugar, cattle and lumber, while imports consisted mainly of provisions (CE 1891:1855). During the 1880 survey, a sunken flatboat was reported in mile 54 at

the junction of Mill Bayou and a sunken boat was reported on mile 56, near Hamburg (CE 1880:1176-1178).

Bayou Fordoche

This channel was once traveled by steamers before the raft was cleared from the Atchafalaya. With Bayou la Rose, Bayou Fordoche formed a connection between the Atchafalaya River and Grand Lake. By 1880, Bayou Fordoche was no longer used by steamboats (CE 1880:1173), and commercial statistics for this waterway have not been found.

Grand River and Bayou Pigeon

These two channels are located along the eastern edge of the Atchafalaya and both were used extensively by commercial boat traffic in the nineteenth century. In 1893, contracts were let for the removal of the wreck of the steamboat *G.W. Anderson* in Grand River and for the removal of the steamboat *E.H. Barmore* in Pigeon Bayou. The *Anderson* was blown up with dynamite and removed in 1894. According to the account, ". . . nothing of value was recovered from the wreck" (CE 1894:1383). The *E.H. Barmore* was reportedly removed from the channel by its owner. Further work was authorized to improve the route between Bayous Sorrel and Pigeon. This would form a continuous route through Upper Grand River to Flat Lake to the Teche and into the Atchafalaya and enhance steamboat transportation through the Atchafalaya Basin. It was reported that "The completion of this work opens a competing steamboat route in connection with the Texas and Pacific Railway at Plaquemine, and has already caused a reduction of freight rates from the Teche of 33 1/3 per cent" (CE 1894:1362).

In 1902, a contract was awarded to Charles Clarke & Co. to excavate a channel 50 ft wide and 10 ft deep through Flat Lake and Bay Natchez. Work began in Flat Lake in July with dump scows; the excavated material was deposited in the deep water of Berwick Bay. The work to cut a channel across the lake was made difficult by the large numbers of stumps encountered. Bay Natchez was mostly free of stumps and work there was comparatively easy. The dredging across Bay Natchez was carried out with the suction dredge *Arthur*. At a point near the mouth of Lake Natchez, stumps were encountered and additional equipment was brought in to handle the situation. A dipper dredge was used to loosen and blast the stumps, while a larger suction dredge, simply referred to as *No. 7*, followed, excavating the channel (CE 1903:1294).

Bayou Grosse Tete

Bayou Grosse Tete, located on the eastern margin of the Atchafalaya Basin, extends from Bayou Plaquemine northward and only its southern portion falls within the study area. Gross Tete has served as a locally important waterway during the entire period of European settlement of the region. During the late-nineteenth century, Bayou Grosse Tete, at low water, averaged from 80 to 100 ft wide and had an average low water depth of 10 ft. Although the head of navigation was stated to be at the community of Livonia in 1897, about 30 mi from the junction of Bayou Grosse Tete and Bayou Plaquemine, navigation below that point was restricted considerably by four bridges crossing the bayou. The bridge at the town of Grosse Tete would only allow vessels through if they were less than 12 ft wide and less than 50 ft long. The lowermost bridge was located about 8 mi below Rosedale (CE 1897:1782).

By 1914, improvements had opened the channel to larger vessels such that the head of navigation for steamers at low water was 11 mi above the mouth, while smaller boats could navigate to about 5 mi above Maringouin. Available water depth from the mouth to mile 10.3 was 5 ft and from mile 10.3 to Maringouin was between 5 and 2.5 ft (CE 1914:787).

Commercial activity along Bayou Grosse Tete increased after clearing and dredging was completed on Bayou Plaquemine in 1894. In 1896, a steamboat with two barges was making regular trips up the Grosse Tete. This represented the first major steamboat commerce on Grosse Tete since Bayou Plaquemine had been dammed in 1867. In 1896, this steamer made 76 trips and its export cargo included lumber, cattle, cotton, cottonseed, corn and wood. Import cargo consisted of general merchandise (CE 1897:1783). By 1919, 5 steamers, 15 gas boats and 20 barges were operating on Bayou Grosse Tete. In that year, commerce was dominated by logs and lumber products. Other commercial freight included sugarcane, moss, fuel oil, potatoes, rice and sugar. The steamers and gas boats made a total of 842 trips in 1919 carrying this merchandise (CE 1919:2675).

In 1913, an "old barge" was removed from Bayou Grosse Tete between the mouth and the town of Maringouin (CE 1914:787).

Bayou Plaquemine

Bayou Plaquemine represents an abandoned distributary of the Mississippi River, connecting the Mississippi with Grand River to the west. Bayou Plaquemine leaves the Mississippi about 10 mi below Baton Rouge. As has been discussed previously, this bayou has served as the most important entrance into the Atchafalaya Basin from the Mississippi River throughout the historic period. The importance of navigation on Bayou Plaquemine is reflected in the fact that efforts to clear it of obstructions began as early as the 1770s. Up to the Civil War, Bayou Plaquemine served as a principal route for all types of watercraft going into and out of the Atchafalaya and Teche region from the Mississippi. In 1867 or 1868 the Police Jury of Iberville Parish, primarily because of concerns over flooding, constructed a dike across the eastern end of the channel of Bayou Plaquemine, shutting it off from the Mississippi River. Prior to that closure, the bayou was considered navigable by even large steamboats (CE 1893:1818). However, portions of the channel went dry during periods of low water.

Navigation surveys of Bayou Plaquemine were conducted by the Corps of Engineers in 1880, 1887, 1893, 1900 and 1901, mainly for the purpose of evaluating the potential for constructing a lock at the bayou's junction with the Mississippi River. The Plaquemine Lock was constructed between 1895 and 1909. This feature reopened an inland water route between Bayou Teche and New Orleans. Channel clearing and dredging were conducted along the bayou both before and after the lock construction. Snags and obstructions were removed in practically every year between 1889 and 1911.

Between 1867 and 1911 commerce along Bayou Plaquemine was of a local nature and the channel was of sufficient depth to accommodate steamboats during high water, but in time of low water the channel was dry above some shoals (CE 1882:1417). Between 1867 and 1893, the bayou was navigable only for small vessels which were engaged primarily by sawmills (CE 1895:1758).). Seven sawmills were located along Bayou Plaquemine in 1892. Logs were hauled into Bayou Plaquemine from the west by small steamers, and the lumber products were carried to the Mississippi River for shipment (CE 1892:1493). The east end of Plaquemine Bayou was not utilized by large steamboats again until snagging operations cleared the channel of obstructions in 1894 (CE 1894:1362, 1365). In 1891, wagons were used to haul goods to a landing at the entrance to the bayou where they were loaded onto steamboats in the Mississippi bound for New Orleans. Locally produced goods being shipped included sugar, molasses and moss (CE 1890:1825

Typical commerce carried on Bayou Plaquemine, after completion of the lock, is indicated for the year 1911 in Table 3-3. The numbers and types of commercial vessels utilizing the channel for that year are provided in Table 3-4.

Corps of Engineer's accounts of 1882 report an old boat wreck in the channel of Plaquemines Bayou about 1 mi west of the confluence with Bayou Grosse Tete (CE 1882:1416-1418).

Bayou Teche

Bayou Teche was one of the most important commercial waterways in the study area in the nineteenth century. The rich soils of the Teche's wide natural levees made it one of the most important centers for the production of sugar and cotton in the state. Bayou Teche provided the outlet for these and other agricultural products and served as the principal avenue for incoming goods. Although utilized extensively prior to 1800, except for clearing snags and logs, no major attempts appear to have been made to improve navigation along the bayou until the 1870s. The channel was the subject of a detailed survey made in 1870 by Captain C.W. Howell. That survey indicated the channel was 6 to 12 ft deep at low water from the mouth to about 10 mi above New Iberia. Between New Iberia and St. Martinville was a stretch several miles long that was 1.5 to 4 ft deep at low water. Sidewheel steamboats plied the channel below New Iberia, but only sternwheelers traveled the shallower channel above there (CE 1880:1168). During the nineteenth century, Bayou Teche was considered navigable to steamboat traffic all year long only as far up as St. Martinville, a straight-line distance of about 45 mi above the bayou's mouth at Berwick Bay (CE 1889:1516-1517). Except at low water, a small steamer ran above St. Martinville to Breaux Bridge. This 12-mi-long section of the bayou was considered navigable only about 10 months a year. The approximately 10-mi stretch of Bayou Teche above Breaux Bridge to Arnaudville was navigable for only about three months a year.

Dredging was considered a standard means to improve navigation in the bayous and streams in the area, but other measures were also explored. An

Table 3-3. Commerce on Bayou Plaquemine for the 1911 (CE 1912:1963).

Articles	Amount (in short tons)	Average haul or distance freight was carried
Logs	654,500	30
Lumber	17,051	70
Wood	3,400	20
Hides, furs, and moss	618	25
Fuel oil	48,873	70
Refined oil	245	35
Fish	1,118	45
Coal	3,640	70
Manufactured Iron and steel	708	70
Molasses	905	70
Cooperage	3,200	25
Livestock	146	30
Sugar	15,990	70
Cement	596	70
Ties	1,881	35
Rice	149	70
Sand and gravel	2,404	70
Brick	745	70
Cane	5,500	50
Feed	280	60
Potatoes	25	70
Wax and honey	21	35
Oysters	139	70
Miscellaneous	39,195	70
Total	**801,419**	

Table 3-4. Watercraft Navigating Bayou Plaquemine for the Year 1911 (CE 1914:2242).

Classes	Number	Net Registered Tonnage	Passengers
American			
Registered:			
Steamers	56	177,475	2,343
Gas boats	6	7,190	
Unregistered:			
Gas Boats	14		
Unrigged (barges)	50		
Miscellaneous motor boats	123		
Total	**252**	**184,665**	**2,343**

interesting observation noted in Bayou Teche was that steamer traffic had a direct effect on the movement of sediments in the channel, especially on the smaller or narrow streams. It was observed that:

> Side-wheel steamboats, such as are below New Iberia, and not above, are so constructed that there is a strong current from their wheels washing the bottom from some distance away from the mid-channel out to the banks, but no current at all in the middle, consequently the heavier portion of the material washed up is deposited in mid-channel behind the boat, and the swell of the boat, which is greater than that from a stern-wheel boat, washes the banks, and causes the widening of the surface. The stern-wheel boat spends the force of its engines on the one wheel at its stern, and the current from it washes up the bottom in the center of the bayou only, and the tendency of the heaviest part of the material washed would be to the more quiet water of the sides. So it would have a tendency gradually to improve the navigation, while the side-wheel boat far more rapidly destroyed it [CE 1880:1169].

Snagging operations prior to 1886 cleared a channel ". . . sufficient to permit a vessel 40 ft wide, drawing 5 ft, to ascend to a point 3 mi above Arnaudville, and 2 mi further except for the obstruction of a fixed bridge" (CE 1886:1247). Passage was difficult for steamers above Breaux Bridge at extreme low water, and flatboats were regularly used on the upper reaches, i.e., Bayou Courtableau, except during periods of high water (CE 1880:1166-1168; 1889:1516-1517). These flatboats were sometimes propelled upstream by warping or cordelling (i.e., pulled by a rope from a towpath along the bank); however, many were towed by steamers (CE 1883:1113). All major channel obstructions had been removed from Bayou Teche as far up as Port Barre by 1886 (CE 1886:1370). By that year, boats measuring 175 ft by 30 ft could ascend to within 10 mi of Port Barre during high water (CE 1887:1371). The origin of Bayou Teche was generally considered to be at Port Barre, because at high water the Teche was fed by Bayou Courtableau which joined the Atchafalaya at Port Barre (CE 1897:1785).

Each plantation along the bayou had its own boat landing for shipping freight. In the latter half of the nineteenth century, the major export items were sugar, molasses, rice, corn and other agricultural products. Imports included general merchandise, coal, wood, machinery, logs, split lumber and sawed lumber. In 1880, bayou commerce involved 3 large steamers and about 20 small ones. Ocean schooners and coal barges were also commonly used on Bayou Teche, the former along the lower reaches below the town of Franklin (CE 1883:1112-1116). Some of the steamers made regular trips to New Orleans at least once a week and daily trips were made from the upper Teche to Morgan City (CE 1884:1273).

A sample of late-nineteenth century commerce over a three-month period along the upper Teche is provided in the following report:

> United States Wrecking Flat
> Breaux Bridge, La. June 5, 1886
>
> Sir: I have the honor to report that the number of steamboats that have gone above Breaux Bridge since March, 1886, is as follows: 1. The Danton, two trips, with flat-boat in tow, carried merchandise up and 1,500 sacks of cotton-seed down each trip. Length of boat about 200 feet. 2. The Mary V. Alice, two trips, with flat-boat in tow, carried merchandise up; coming down loaded at Arnaudville once with 1,500 sacks seed, and once with 1,450 sacks seed and 10 bales cotton. Length of boat about 80 feet. 3. The A. Durio, four trips to Arnaudville, carried up 10,000 feet lumber; brought down 700 sacks of seed each trip. Length of boat about 67 feet. 4. The Hattie Bliss, one trip to Arnaudville carried theatrical troup. Length of boat, 80 feet. One flat-boat went up carrying 8,000 feet of lumber. Six flat-boats came down bringing 500 sacks of seed, 10 hogsheads of sugar, 15 bales of cotton, bones, and firewood. Lengths of boats from 40 to 55 feet. One of these came through from Bayou Courtableau.
>
> The steamboat captains and pilots, also the owners of the Durio, speak in high terms of the improvements on the upper Bayou Teche, and their opinion is that if locks be built, the upper bayou will be navigable all the year.
>
> Very respectfully, your obedient servant,
>
> Peter Oliver, Watchman
>
> Maj. W. H. Heuer
> Corps of Engineers, U.S.A. [CE 1886:1248]

In a summary report the following year, E.T. King described the commerce between St. Martinville and Breaux Bridge as including:

> . . . only two small steamboats running in the trade. I am informed by the owners and captains of the boats that the steamer Danton makes two trips a week in high water this year for about two months; for the balance of the year, when there is water enough to get to Breaux Bridge, one trip per week. When there is not, she makes occasional trips as high as she can get up, and then has to discharge her cargo and ship in small flat-boats. The steamer Alice makes fifteen or twenty trips a year during high water. The steamer Durio makes some four or five trips a year for cotton-seed for the Iberia Oil Mill.
>
> The charge for freight is one-half of what is charged by the round-boats to the city of New Orleans, which is 33 1/8 per cent, less than the railroad charges [CE 1887:1372].

A listing of commercial goods carried on Bayou Teche in 1887 is provided in Table 3-5. These cargoes typified the period. The classes of vessels carrying these goods are listed in Table 3-6. By the 1930s, sugar, rice, cotton and wood products were still major commercial cargoes, but all of these were outranked in volume by crude oil (Table 3-7). By 1935 barge and motor vessel traffic had surpassed steamer traffic by a wide margin (Table 3-8).

Steamboat traffic was extensive on the Teche until the completion of Morgan's Texas and Louisiana Railroad west from Morgan City during the 1870s. Packet boats continued in use on the Teche after 1880, but competition with railroads reduced their numbers drastically. By 1915, packet boats no longer traveled on Bayou Teche; the last steamboat known to operate on the bayou was the *Amy Hewes*, which retired in 1943 (Goodwin et al. 1985b:186-188). Table 3-9 provides information on the types and number of vessels in use on Bayou Teche between 1892 and 1936.

Numerous wrecks were reported within the Bayou Teche channel during the various Corps of Engineers surveys conducted between 1870 and 1880. As a group, the wrecks were considered a hazard to navigation and were described as follows:

> Some of the wrecks will be difficult of removal; but little besides the hull of each remains. All are visible at low water, most of them at high water. Nearly all are much decayed and partially broken up; the few that are comparatively sound can be shattered by several small charges of powder properly placed under them. All are but slightly imbedded in the mud. The bayou is narrow, and all the wrecks lie from 10 to 75 feet of one bank or the other. The slope of the bed of the bayou and of the banks is favorable for dragging out these wrecks either entire or piecemeal [CE 1870:348].

By 1872, channel clearing along Bayou Teche had included the following wrecks: the Confederate gunboats *J.A. Cotton, Diana,* and *Hart,* and steamers *Fly Catcher, News Boy, Gossamer, Minerva, Andrews* (probably the *W.A. Andrew*) and *Guide*; two schooners and two barges. Vessels partially removed included two steamers, *Rob Roy* and *Iberia* and one "lighter" (CE 1872:556). Later, another unidentified wreck was reported in Bayou Teche at St. Martinville (CE 1880:1168).

After wreck locations were identified in 1870, recommendations were made for total removal of all except the gunboat *Cotton*. For the *Cotton,* a navigable channel could be obtained by "only removing that part of the wreck forward of the wheel shaft" (CE 1870:349). The State of Louisiana was responsible for removal of wrecks above St. Martinville and the Federal Government (U.S. Army Engineers) was responsible for wreck removal below that point (CE 1870:350). The wreck of the 174-ft, sternwheeler *John M. Chambers* was removed during April 1885 (CE 1885:1398). A detailed account of the removal of this wreck demonstrates the amount of effort sometimes involved:

> NEW ORLEANS, LA., *April* 13, 1885.
>
> SIR: I have the honor to report as follows upon the progress made in removal of wreck John M. Chambers from Bayou Teche, Louisiana: The work was begun April 1. Two cypress trees which had lodged in the wreck, pieces of smoke-stack, two rudders, and other pieces loosened by a twenty-pound blast of powder, were removed . . . . On the 3d (Friday) I began breaking up the wreck with charges of Atlas powder . . . . Charges varying from 3 pounds to 28 pounds were used in cartridges varying from 2 to 25 feet in length, and having from one to six fuzes in circuit. The Laflin and Rand magneto machine, belonging to the United States snag-boat, was used for exploding the fuzes. The charge was made up without breaking the half-pound cartridges as supplied further than to split the paraffined paper with a penknife. These cartridges were laid in single or double file, with or without intervals accord-

Table 3-5. Commerce on Bayou Teche for the Year 1887 (CE 1887:1373).

Commodities		Quantities	Total value, 1886
Exports			
Centrifugal sugar	pounds	1,502,627	$ 75,131.35
Kettle sugar	do	1,173,500	46,948.00
Centrifugal molasses	gallons	70,850	17,712.50
Kettle molasses	do	59,605	20,861.75
Cotton	bales	10,685	480,825.00
Cotton seed	tons	4,118	32,944.00
Cotton-seed oil	barrels	2,200	37,400.00
Cotton-seed cake and meal	tons	1,300	23,400.00
Lumber shipped	feet	500,000	75,000.00
Eggs	dozen	215,480	21,584.00
Mules and horses			10,025.00
Hides		4,925	7,387.50
Poultry	dozen	4,285	12,855.00
Moss	bales	1,200	7,500.00
Cattle and stock			2,720.00
Esculents, potatoes, etc.			1,750.00
Articles not enumerated or omitted			35,000.00
Total			**$ 909,044.10**
Imports			
Lumber in log	feet	2,108,000	168,640.00
Machinery			39,600.00
Stone coal			15,480.00
Necessities, luxuries, and farming implements, etc., 80% on exports			727,235.80
Total commerce, exports and imports			**1,859,999.00**

Table 3-6. Commercial Vessels Navigating Bayou Teche in 1887 (CE 1893:1503).

Number of steamers	4
Registered tonnage	1,362
Number of trips made	36
Aggregate tonnage of same	13,297
Barges entering the bayou with coal	85
Aggregate tonnage of same	53,370

Draft of largest steamer, light, 2.5 feet; loaded, 8 feet.
No new lines of transportation have been established during the year.

ing to strength required, and inclosed in a strip of rubber packing or cotton-duck. At first packing was used, and the edges stitched together in making up the charge, but after the first half-dozen blasts I used the duck, which was only tied around the cartridges at such intervals as to secure all in place.

The fuzes were placed at average intervals of about 4 feet. The joints were wrapped with cloths, then dipped in pitch . . . . When I left the work on Saturday, a portion of the sides and of the deck and hull framing amid-ships remained to be removed. This was, however, so broken up by blasts made on Friday that few others would be needed. The whole of the crew had grown familiar with the handling of the explosive, and Mr. Oliver, the overseer, has long been familiar with the use of gunpowder in submarine work . . . .

Much of the oak timber was so heavy as to sink if unsupported. This and all other debris was eagerly taken by men in skiffs, who were ever on the alert to pick up the material afloat or take from the snag boat that which would otherwise be landed to prevent sinking. A good deal of time was thus saved; only a few pieces, too large to be handled by the skiffs, were landed by tackle ashore...The build of the Chambers was very strong; a multitude of bolts and many very heavy timbers were met. Two hundred pounds of "Atlas A" and 105 pounds of "Hercules No. 2" powder had been used when I left. A few more blasts will doubtless be made by Mr. Oliver to facilitate the completion.

The number of blasts was thirty-four; total length of charge, 500 feet; fuzes, total number, 110 . . . .

Very respectfully, your obedient servant,
O.T. CROSBY
First Lieutenant, Engineers.
[CE 1885:1428-1429]

Not all wrecks had to be destroyed before removal. In 1887, the wreck of the steamboat *Maria A.* was removed by raising it. The vessel was then towed to New Iberia and sold at public auction (CE 1887:1393-1394). Coal boats were apparently sinking with such frequency that they were ". . . constantly forming obstructions which will require removal" (CE 1892:1503). A contract was let for the removal of one such vessel in March of 1892 (CE 1892:1513). Two coal barges were removed in May 1893 (CE 1893:1839), three unidentified wrecks were removed in 1894 (CE 1895:1763), and an unreported number of wrecks were removed in 1896 (CE 1897:1764). In 1899, 33 wrecks (primarily coal barges) were removed between St. Martinville and the mouth of the bayou (CE 1900:2260). By 1897, the lower 70 mi of Bayou Teche had been cleared of obstructions and the channel had been dredged 60 ft wide and 5 ft deep (CE 1897:1764). By 1901, the bayou was considered free of wreck obstructions (CE 1901:1899), although 2 wrecks were removed near St. Martinville in 1903 (CE 1903:1296).

Other obstructions or hindrances to navigation were the water hyacinths, introduced floating plant, that choked the waterways. Two vessels were used

Table 3-7. Commerce on Bayou Teche for the Year 1935 (CE 1936:638).

Domestic

In-Bound	Tons
Animals and animal products:	
Lard	610
Meat, canned	45
Milk, canned	731
Sea foods	103
Shells	57,779
Vegetable food products:	
Beans and peas, dried	2,000
Beverages and liquors	1,390
Coffee	1,805
Corn	45
Flour and meal	115
Fruits and vegetables, canned	482
Hay and feed	436
Oats	170
Potatoes	125
Rice, rough	120
Sugar, refined	1,089
All other	54
Vegetable products, inedible	
Tar and pitch	6
Tobacco and manufactures	9
Textiles:	
Bags and bagging	61
Cotton cloth and clothing	4
Rope	12
Wood and Paper:	
Cordwood	1,584
Logs, rafted	18,609
Lumber, old	160
Paper and manufactures	10
Nonmetallic minerals:	
Gasoline	160
Glass and manufactures	10
Grease, lubricating	56
Kerosene	76
Oil, fuel and gas	7,185
Oil, lubricating	75
Ores, metals, and manufactures of:	
Iron & steel, manufactured	162
Chemicals:	
Ammunition	20
Fertilizer, complete	68
Soap	1,000
Unclassified:	
Roofing	950
All other	1,070
Total	128,520
Value, $2,179,031	

Out-Bound	Tons
Animals and animal products: Furs	15
Vegetable food products:	
Rice, cleaned	11,400
Rice, rough	750
Sugar, raw	3,542
Sugar, refined	3,176
Vegetable products, inedible: Moss	35
Textiles: Cotton	300
Wood and paper:	
Beer kegs and cases, empty	1,630
Lumber	1,600
Nonmetallic minerals:	
Oil, crude	94,939
Salt	100
Ores, metals, and manufactures of:	
drums	33
Machinery and vehicles: Machinery and parts	300
Unclassified: Miscellaneous	1,520
Total	$119,340
Value, $2,728,662	

Up-Bound

Animals and animal products	3
Wood and paper: Cordwood	300
Total	303
Value, $1,000	

Down-Bound

Vegetable food products: Sugarcane	11,563
Wood and paper: Cordwood	225
Total	11,788
Value, $34,850	
Total, all traffic	259,954
Value, $4,944,143	

Table 3-8. Trips and Drafts of Vessels on Bayou Teche for the Year 1935 (CE 1936:638).

	Up-bound				Down-bound			
Draft (feet)	Steamers	Motor Vessels	Barges	Total	Steamers	Motor Vessels	Barges	Total
8		39	106	145		39	106	145
7			73	73			73	73
6		96	38	134		96	40	136
5	5	42	184	231	5	41	181	227
4	94	112	185	391	104	112	182	398
3		261	13	274		243	13	256
2								
1		30		30		30		30
Total	**99**	**580**	**599**	**1,278**	**109**	**561**	**595**	**1,265**
Total net registered tonnage	**3,963**	**18,590**	**181,089**	**203,642**	**4,813**	**18,451**	**180,239**	**203,503**
Passengers: Regular		3				3		

Table 3-9. Commercial Vessel Use on Bayou Teche Between 1892 and 1936 (CE 1936:637-638).

Year	Steamers	Sailing Vessels (Schooners)	Barges	Gas Boats	Total Vessels	Total Trips
1892	4		85		89	
1900	20	10	170		200[1]	1,180
1910	32		89		121	5,285
1920	17		80	37	134	1,928
1930	NA		NA	NA	NA	981
1936	NA		NA	NA	NA	1,278

Draft of heaviest vessel: Light, 3 ft; loaded, 7 feet

in southern Louisiana in 1905, the *Ramos* and the *Hyacinth*, to control the problem (Becnel 1989:138). The *Ramos* was a sternwheel, towboat/snagboat built in Ramos, Louisiana in 1896 measuring 97.5 ft long, 22.5 ft wide and with a depth of hold of 3.5 ft. She was purchased by the New Orleans District in 1899, rebuilt in 1900, and based at Plaquemine. The *Ramos* was off the enrollment list in 1913 (Way 1994:188). The *Hyacinth* was a sternwheel towboat built in 1904 at Patterson, Louisiana. She was built by private owners but sold to the New Orleans District in 1905. The *Hyacinth* was 102.5 ft long, 28 ft wide and had a depth of 2.5 ft. She was rebuilt in 1923 with a new hull measuring 119 ft long, 23 ft wide and 5.3 ft deep. The *Hyacinth* disappears from official records in 1939 (Way 1994:101).

Bayou Terrebonne

The western bank of Bayou Terrebonne between Thibodaux and Houma forms the southeastern boundary of the study area, such that the bayou channel itself does not properly fall within the area of interest. The portion of Bayou Terrebonne below Houma is located entirely outside of the study area. However, the bayou was connected to waterways within the study area and has been an important route of waterborne commerce since the earliest period of European occupation. Because of this, some discussion of watercraft activity and commerce on Bayou Terrebonne is considered pertinent.

Bayou Terrebonne represents a relict-channel segment of the Lafourche (or Lafourche-Terrebonne) deltaic system and extends from its juncture with Bayou Lafourche at Thibodaux southward through Houma before emptying into the upper end of Terrebonne Bay. Bayou Terrebonne was once an outlet of the Mississippi River via Bayou Lafourche, but due to a closure at Bayou Lafourche in the years prior to 1880, the upper bayou silted in and navigation above Houma became impossible. During the early-nineteenth century, Houma, located about midway between Thibodaux and the Gulf, served as the head of navigation on Bayou Terrebonne. Below Houma, Bayou Terrebonne was tidally influenced and became the most important water access from the region into the Gulf of Mexico. In a Corps of Engineers survey report in 1880, Bayou Terrebonne was examined in some detail in preparation of dredging the following years. The report notes that the roads along the lower bayou were useless for moving freight. The best avenue depended on the navigation of Bayou Terrebonne, which also connected with other bayous to get produce to market.

Beginning in the third decade of the nineteenth century, steamboats began to travel the waters of the Terrebonne region. Bazet (1934:37) reports that the *S.F. Archer* was one of the first steamers to operate exclusively in Terrebonne Parish. Built along the Ohio River at New Albany, Indiana, in 1854, the sidewheeler *Archer* was owned by J.J. Shaffer & Company and traveled along Bayou Black, making connections with the railroad at Tigerville (Way 1994:407). By 1880, the channel of Bayou Terrebonne above Houma was little more than a drainage ditch and was useless for navigation. Below Houma the channel was a shallow tidal bayou. At this time, two steamers traveled the lower end "bringing freights from plantations on Terrebonne and other connecting bayous to Houma for shipment by rail" (CE 1880:1179-1180). Dredging of the channel was initiated in 1881. Before completion of the first dredging, the bayou at Houma was reportedly 40 ft wide and 4 ft deep, and at low water it was only 10 ft wide and 6 in deep (CE 1889:1508). All navigation at the upper end of Bayou Terrebonne was done at high tide. Above the entrance of Bayou Cane the channel was practically dry. The towboat *Harry*, stationed at Houma, sometimes ascended to the mouth of the Cane during high water (CE 1887:1397). This towboat was about 18 ft wide and had a draft of about 18 in (CE 1891:1844). A considerable amount of freight was carried by schooners that sailed between New Orleans through the lower bays and other connecting bayous. Prior to 1880, commerce on the upper Terrebonne was handled "by flatboats which were cordelled and poled from plantations up to Houma" (CE 1880:1179-1180). The 1881 dredging project created a 6-ft-deep channel below Houma.

After the 1881 dredging, steamboat traffic to Houma increased. Among the steamers operating in the region were the *Harry, Laura, Sadie Downman* and the *N.H. Breaux*. The *Harry, Laura* and the *Sadie Downman* belonged to the Daigle Barge Line, whose founder was Emile A. Daigle. Reportedly, in 1881 the *Harry* and the *Laura* were among the largest steamers on the Terrebonne. They carried only freight in the early days, towing barges loaded with lumber and sugar and produce to Houma to be shipped to New Orleans. They would carry groceries, dry goods and other supplies on the return trip. In the early steamboat days, Emile Daigle would dredge the bayou in Houma at his own expense to keep his boats running. He, also, had a wharf in town where he built

barges and had a crew of painters and carpenters to maintain his boats. Emile Daigle had a large interest in the drayage business and owned several landings and wharfs along the bayou. In addition, he was a charter member of the Houma Fish and Oyster Company and had an interest in an oyster shop at Sea Breeze.

The *Harry* and the *Laura*, also, towed long strings of barges loaded with "Beaumont" oil. "Sometimes you could see as many as eight or 10 barges trailing behind one of the big boats. The last barge had a long chain dragging an anchor to keep the tow from swinging. You could always tell where the anchor was by the stream of bubbles." Sugar, also, was a commodity for steamboats on Bayou Terrebonne. In 1905, a newspaper advertisement noted that the steamer *Houma* was bound "For All Landings On Lower Terrebonne to Sugar Refinery and Houma. . . . " (Huber 1959:32).

Ultimately, local drainage ditch discharges created shoals in Bayou Terrebonne that again reduced water depths. By 1885, only one or two small steamboats traveled the lower channel (CE 1885:1407). Dredging of a 4-ft channel from the mouth to the railroad depot at Houma was begun in 1880 and completed in 1887 (CE 1888:1250). By 1886, channel improvements were sufficient to allow one or two small steamboats to periodically run up to Houma (CE 1886:1265). During the later part of 1915, the dredge *Delatour* excavated a channel from the St. Louis Cypress Company bridge in Houma to Bush Canal, the end of channel improvement. The channel was dug to a depth of 6 ft and a bottom width of 50 ft (CE 1916:2449).

Information presented in the Annual Report of the Chief of Engineers on the commercial statistics for Bayou Terrebonne for the year 1915 for registered vessels shows a total of 7 steamers and 12 gas boats operating on the bayou at that time. The steamers carried a total of 1,500 passengers. For unregistered vessels there were 375 gas boats and 150 unrigged barges. The freight that was carried during the year consisted of a variety of articles. The item that had the greatest value was sugar, valued at $1,132,000. A large quantity of logs was shipped in that year; 15,604,300 feet or an equivalent of 62,417 short tons, reflecting the importance of the timbering industry in the early years of this century. Other commodities shipped in large amounts were ground and grain feed, fertilizer, molasses, fuel oil, oysters, potatoes and miscellaneous merchandise. Smaller quantities of brick, cement, coal, cooperage, lime, lumber, machinery, naval stores, pilings and cypress ties were shipped, as well as, agricultural products such as, corn, eggs, furs, fish, hides, moss, oats, rice, salt, and shrimp (CE 1916:2449-2450). Between 1888 and 1935, freight tonnage on the Terrebonne increased from 5,416 to 115,666 tons. During roughly the same period steamship traffic increased from 15 to 252 trips and barges made from 9 to 2184 trips. As on other waterways, barges represent the deepest draft vessels by 1935. The sternwheeler *N.H. Breaux*, which succeeded the *Laura*, is reported to have been the last steamboat on the bayou in 1930 (*Houma Daily Courier* September 26, 1971).

Another of the area's waterways for which commercial traffic and navigation information are available is Bayou Petit (or Little) Caillou, one of the waterways leading into western Terrebonne Bay. Petit Caillou falls just outside of the present study area, but it did serve as a route of access into the study area from the Gulf of Mexico. Measuring about 28 mi long, Petit Caillou is a relict distributary of the ancient Lafourche-Terrebonne deltaic system. The upper channel was reportedly filled and was no longer considered navigable by 1882. At that time, the water depth at the channel mouth was from 2 to 11 ft. During the late nineteenth century, several man-made canals, generally about 4 ft deep, connected Bayou Petit Caillou with other waterways (CE 1882:1413-1414). No information is provided in Annual Reports on commerce for Petit Caillou until the 1930s, apparently indicating a minimal amount of commercial traffic traveling along the bayou. By this date, the vessels using the bayou were "motor" vessels and barges and much of the commerce reflected the oystering and shipping activities of the area.

Bayou Grand Caillou, also immediately outside of the present study area, is about 28 mi long and empties into Caillou Bay. Like Bayou Petit Caillou, this bayou served as a route of access from the Gulf of Mexico into waterways of the study area. In 1882, this channel was entirely filled at the upper end and was open with 5 to 8 ft of water throughout most of its lower segment. Vessels traveling on Grand Caillou reportedly did not draw more than 7 ft of water (CE 1882:1411-1412).

The Houma Navigation Canal (HNC), which extends from the GIWW near the town of Houma to the Gulf of Mexico and forms the southeastern boundary of the study area, was built by local interests in 1962 to provide a ship canal from the GIWW to the

Gulf. The HNC has served the oil and seafood industries and recreational needs of fishermen. When constructed in 1962, the channel dimensions were 15 ft deep and 150 ft wide. The total length of the canal was 40.5 mi long with 10 mi in Terrebonne Bay and 3.9 mi in the Gulf of Mexico. The River and Harbor Act of 1962 authorized maintenance of the canal by the Corps of Engineers. Maintenance of the canal by the Corps was initiated in November of 1964. In 1973, the project dimensions of the HNC were increased to 18 ft deep and 300 ft wide.

Freshwater Bayou Canal

The Freshwater Bayou Canal is located at the extreme western edge of the study area. This is a manmade canal completed in 1968 which incorporates portions of Freshwater Bayou, Belle Isle Canal, Six Mile Canal and Schooner Bayou.

Folk Craft in the Study Area

As discussed earlier in this chapter, the majority of watercraft used and lost within the study area are the small, locally made boats which have been used throughout the historic period. Cultural resources studies have already demonstrated that well preserved examples of these craft do exist as archeological sites in the region, and many more are expected to be found. In light of the high potential for occurrence of these craft in the region, a brief discussion of these local and truly vernacular boats, termed here "folk craft," is presented. Much of the information presented here is derived from Pearson et al. (1989).

Folk boats can be generally described as "wooden craft made by hand in forms that have been handed down over time and learned by each generation of builders through imitation, oral instruction, and practice. Such boats are traditionally constructed by their users or acknowledged local makers" (Comeaux 1985:161). Folk boats quickly became part of the study area's transportation/commercial history. In its time and place, each vessel filled a transportation niche, and today, reflects the region's cultural heritage and history. Like house types, they are one of the most outstanding characteristics of the area's vernacular material culture. With settlements largely on or near water, the water bodies became an integral part of the daily living activities throughout the study area. Without these water courses, many settlements would never have come into existence. Each water route had its own particular use, commerce, and requirements of freedom of movement, and from the Atchafalaya to the smallest bayou, water traffic was a part of the local geography, and boats were a necessity. In recent years, roads have replaced the necessity for boats; nevertheless, they are still essential in the regional trapping, fishing and swamp economies. Even if they are no longer utilized for commercial activities they are still often in use as a daily means of transportation.

Folk boats are, generally, a well-documented regional cultural trait in south Louisiana (Comeaux 1972, 1985; Knipmeyer 1956). Analysis of the design of folk boats in the study area provides two general characteristics: the hull's planks are placed edge to edge to produce a smooth surface, and all are flat-bottomed. If a keel is used, it will be external. These vessels readily identify the French cultural complex from the surrounding Anglo-American communities. Six major types of folk watercraft can be identified in the study area: 1) *pirogue*, 2) plank *pirogue*, 3) *chaland*, 4) *esquif*, 5) *bateau*, and 6) flatboats (Knipmeyer 1956).

The oldest type of "folk" boat found in French Louisiana is the pirogue or dugout canoe, which has been discussed earlier. As noted, the early pirogues were often quite large; only smaller versions are in use today. During the Colonial period, when large freight pirogues were in relatively common use, Surrey (1916:57) indicates that the larger ones could carry up to 50 tons of freight, however, this seems extremely high. Pirogues, as freight vessels, continued in use throughout the eighteenth century, and as late as 1830, some cargo was being transported to New Orleans in large cargo pirogues. Subsequently, only the smaller version remained in use.

Although originally all pirogues were dugouts, the French soon began making them with sawn planks, and by the twentieth century "plank pirogues" had almost completely replaced the dugout. The plank pirogue came about in part because of the removal of large cypress trees during the late-nineteenth century, plus the availability of cheap sawn lumber. Dugouts soon became part of the region's folklore, and are now rare. Plank pirogues were also called *pirogue en planche* or *peniche*. Pirogues would probably be referred to as canoes elsewhere in the United States, but the term "canoe" was never used in Louisiana (Comeaux 1985:164).

Another major vernacular boat type in the region is the *chaland*. These boats were perfectly rectangular, flat-bottomed, with no sheer and the ends

were designed with a sharp, angular upward slant. Most chalands were about 3 ft wide and 10 to 14 ft long and were used essentially as ferries. They were normally operated by hand and were never used for traveling more than a short distance. Their only purpose was to transport goods and people from one side of a water body to the other. A variation is sometimes called a "plank boat," a type occasionally used for logging. Plank boats are distinguished by a narrow hull which was generally less than 2 ft wide. A special *chaland* used for moss gathering was propelled by oars (Knipmeyer 1956). The *chaland* is considered to be a primitive flatboat type which probably evolved from early barges in French Louisiana (Comeaux 1985:168). Flatboats were commonly used to haul cattle in the study area. These *chaland a boeufs* were "simply a magnified flatboat having a very large cabin pierced by many windows to admit of ventilation for the animals confined within" (*New Orleans Daily Picayune* August 2, 1891).

"Of all the folk boats in French Louisiana, none is more carefully distinguished than the *esquif* or 'skiff'" (Knipmeyer 1956:165). A skiff is flat bottomed with a pointed bow and blunt stern; an ancient design called by most people a "rowboat." Skiffs were propelled by sails and oars and were also called *peniche*, *chaloupe* and *galere*. "As the pirogue declined, the skiff became more important. Many bayou dwellers remember having to travel several days by skiff to get ordinary household supplies" (Knipmeyer 1956:167). With the development of small, internal combustion engines in the late nineteenth century, many skiffs were motorized.

Variations of the skiff include the *canotte* and "standing skiff." The *canotte* is a large skiff which is today powered by an inboard engine and often fitted with a cabin and decking. Equipped originally with a sail, a *canotte* could move relatively easily along Louisiana's coastal lakes and bays. However, to navigate along inland waterways, early *canottes*, along with other shallow-draft boats, often had to be pulled with ropes from shore - called "*la cordelle*." There are very few differences, if any, between a large *canotte* and a small lugger (Knipmeyer 1956:168).

Unlike the *canotte*, that could be cordelled, the "standing skiff" was operated in a standing position using a rowing device called a *joug*. A *joug* elevated the oars and "extended the fulcrum beyond the sides of the boat" (Knipmeyer 1956:169). In the late 1800s this type of vessel was common throughout French Louisiana.

Two recent types of large skiffs which have evolved are the Lafitte skiff and the Atchafalaya skiff. The Lafitte skiff was adapted to handle an inboard engine and is used commonly for inland and nearshore shrimping. The Atchafalaya skiff, today, uses an outboard motor, but versions constructed around the turn of the present century were often fitted with small inboard motors. Many of these early motorized skiffs apparently closely resembled the type that was rowed, as demonstrated by archeological examples discovered along Bayou Shaffer (Figure 3-18) (Pearson and Saltus 1991). In the more recent types, however, the gunwales do not rake up at the stern and the rear bottom is very broad to allow these boats to plane when traveling at high speeds (Comeaux 1985:168).

A large, flat-bottomed boat with a blunt bow and stern is today called a *bateau*. This boat is not the same as the inland watercraft so common in the eighteenth and nineteenth centuries and discussed earlier. Settlers in French Louisiana called these vessels *bateau plat* (Chambers 1972). Probably developed from flatboats, they were in use by 1720 (Knipmeyer 1956). Bateau plats could be propelled by sails; but oars and poles were generally used. They were common on many of the small bayous. A bateau is usually over 15 ft long, 5 ft wide and is sheered forward. The fore, aft, and sometimes sides were partially decked leaving an open well in the middle. Most modern bateaux have inboard motors. Large ones may have a cabin, and the largest can be indistinguishable from flatboats. Smaller bateaux may be powered by jougs. Today bateaux are found only in the Atchafalaya Basin. True bateaux have been almost completely replaced by modern aluminum and fiberglass boat types (Comeaux 1985:170; Pearson and Saltus 1991).

In south Louisiana the term "flatboat" refers to a flat-bottomed vessel that is blunt at both ends and with a stern wider than the bow. These boats are not the same as the Midwestern flatboats or broadhorns which traveled down the Mississippi River. Louisiana flatboats, also called *bateau plats*, were only 12 to 14 ft long and 3 ft wide. They were not decked, had flaring sides, no cabins, and were constructed with horizontal and elbow braces on the inside. Fish wells were common. Early versions were propelled by oars (Knipmeyer 1956:172-173). Modern flatboats are made of plywood and are wider than earlier versions. The modern version is shorter than a bateau (averaging 16 ft in length) and is powered by an outboard motor. With its wide bottom and

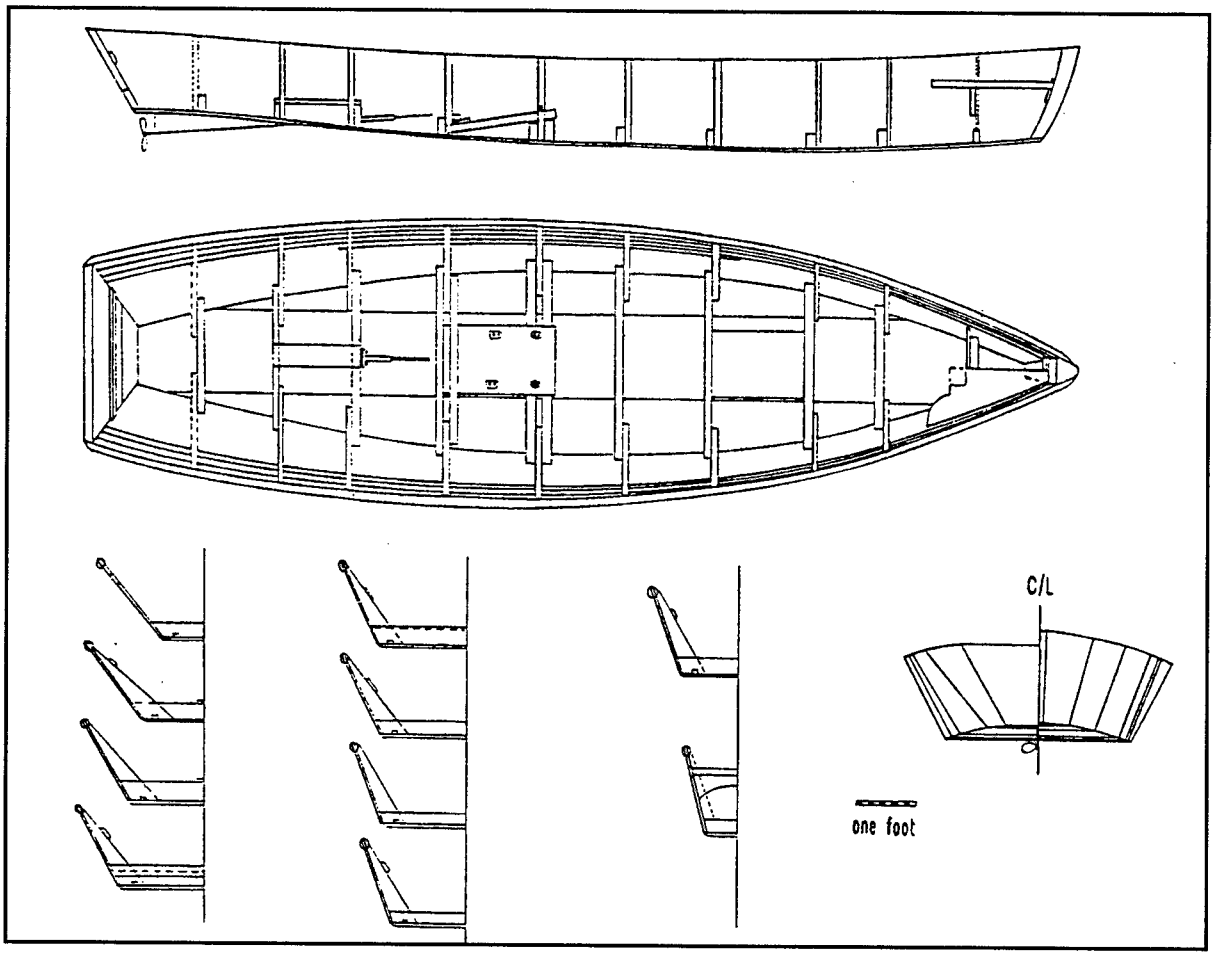


Figure 3-18. An early, twentieth century motorized wooden skiff excavated from Bayou Shaffer in St. Mary Parish. This vessel typifies the wooden skiffs used in the study area during the period from about 1880 to 1950 (Pearson and Saltus 1991:Figure 52).

raked bow, a flatboat can be made to plane; this adaptation has assured their survival (Comeaux 1985:170).

In addition to the major types of folk boats, other less common types also exist. Barges, from which flatboats evolved, are still used for carrying large, heavy loads, for seining, or as a base for a houseboat. Houseboats became common along the Mississippi River after 1828 and in the Atchafalaya Basin after the 1880s. Houseboats are generally about 10 ft wide and 35 ft long. The *New Orleans Daily Picayune* of August 2, 1891, provided the following description of a "store boat" used in Louisiana:

> The *caboteur*, also *pirogue a voile*, was a species of sailboat of good dimensions provided with rudder and oars in addition to the sail, at one end stood a cabin occupied by occasional passengers. This style of peddling vessel carried a mixed stock in trade of groceries, wines, cordials, dry goods, table and kitchenware; having made satisfactory sales of these articles they would return to their original point of departure, laden with freight from the plantations. These square stores would ground at convenient landing places or plantation fronts, or near the villages, and were visited by all the inhabitants of the surrounding country for the purpose of barter. Not coin alone, but poultry, butter, eggs, etc. were occupied in trade. In consequence of this the negroes so frequently raided upon the hen roosts when a peddlers floating store lay convenient, that the planters bestowed upon such boats the opprobrious nickname of voleaurs de volailles, i.e., chicken thieves. . . [in Castille 1993:478-482].

The exact form of the vessel described cannot be determined, but it presumably was a sailing flatboat of some sort.

In coastal areas, the wooden lugger was a common boat type that was used for a variety of commercial purposes, however, its extensive use by oyster fishermen has tended to associated it with that commerce. Luggers generally had one mast (Figure 3-19), but occasionally two or three. Although considered shallow draft vessels, early nineteenth century luggers were deep keeled before the adjustable centerboards were introduced in the 1880s (Castille 1993:318). Luggers evolved from sailing vessels used in the Mediterranean. Modern luggers resemble the *canotte*, have inboard engines, and are about 20 to 30 ft long. Modern luggers, called "Biloxi oyster luggers" are from 40 to 50 ft long and have V-bottom hulls (Comeaux 1985:170-172).

The trawler, introduced from the Atlantic coast, is a specific type of shrimp boat. The small trawler is a version developed for use along the Louisiana coast. Local fishermen sometimes use the term to refer to a Lafitte skiff or other type of watercraft rigged for trawling shrimp (Castille 1993:318-320). Since 1937, offshore shrimpers have used trawlers. These vessels vary in size from the small "shrimp trawler" of less than 30 ft to the "South Atlantic trawler," which is 50 to 65 ft long (Comeaux 1985:170-172).

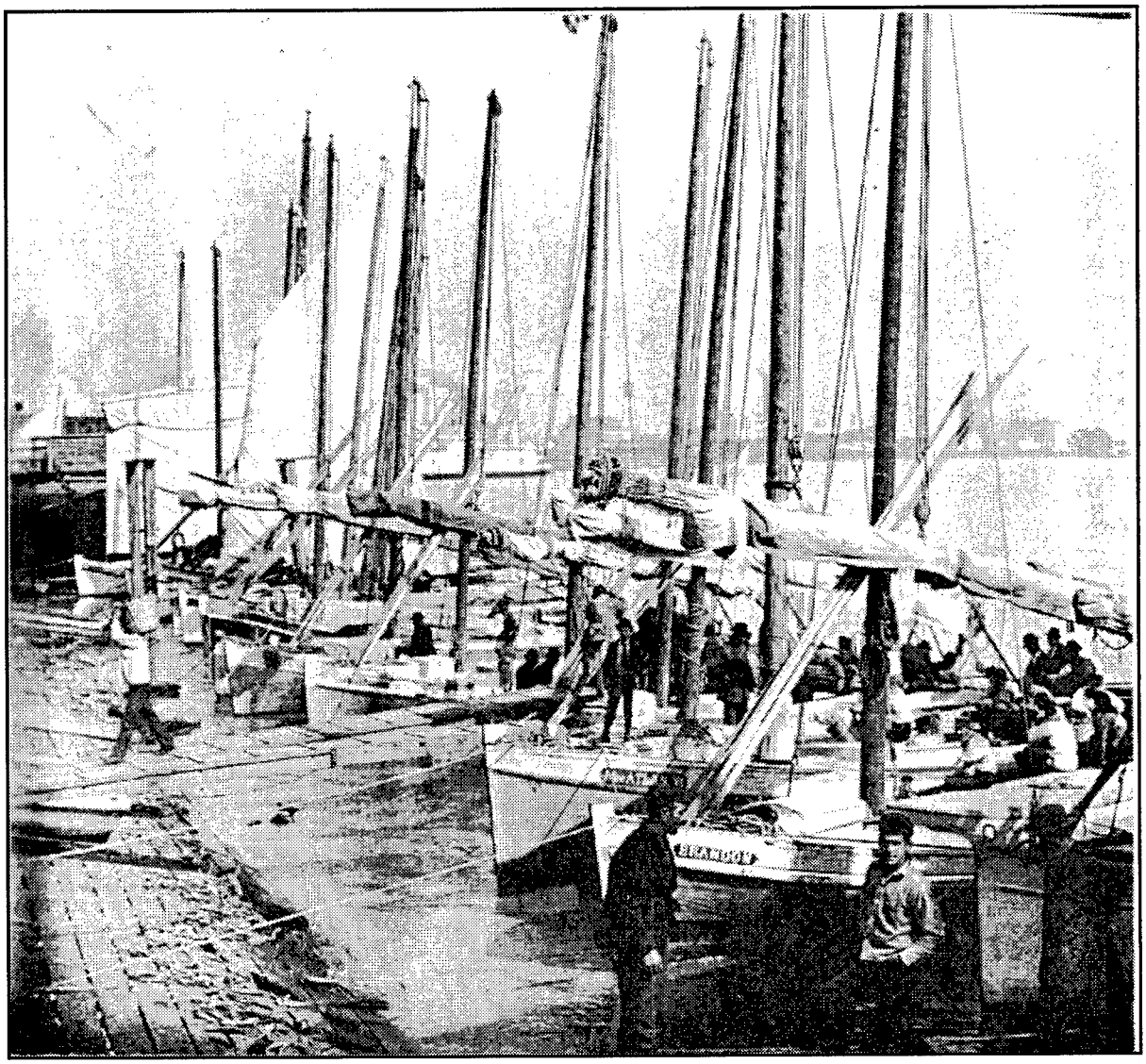


Figure 3-19. View of oyster luggers at New Orleans wharf, early 1900s (Huber 1975:318).

CHAPTER 4

BOAT WRECKS IN THE STUDY AREA

Introduction

This chapter presents a synthesis and discussion of the boat wreck data gathered during this study. The sources used to collect this wreck data have been mentioned previously, plus some information on specific wrecks has been given. Actual tabulation of the wreck data has followed the format presented in Pearson et al. (1989) in their study of wrecks within the entire New Orleans District. The shipwreck data base produced in that study, updated with new information collected here, provides the data set used in the following analyses. An example of the watercraft wreck information form used in the Pearson et al. study and the present effort is presented as Figure 4-1. The key to the various fields used in the form is presented as Appendix A.

Major classes of data collected on wrecks include general information, vessel description, wreck site information and historical documentation. As can be seen in Figure 41, 46 specific categories or fields of data were selected for recording this information. As Pearson et al. (1989:251) note, only in a very few cases could information be obtained for more than 30 fields on any individual wreck. This occurred only in those cases where there had been physical examination of a positively identified vessel. For most of the 1800 wrecks compiled by Pearson et al., information could be collected for fewer than 10 fields in the data recording form. The same is true in the present study. Relatively little information is available for the vast majority of wrecks reported in the study area. We may have the name of a vessel; a location which can be very vague, such as "Atchafalaya River;" or "Last Islands;" and a date of loss. This type of information may be provided for larger commercial vessels operating in the study area, but rarely for smaller boats such as sailing sloops and schooners and, essentially, never for the boats classified as folk craft.

The Pearson et al. (1989) study provides information on the occurrences of reported wrecks across various major waterways and waterbodies within the New Orleans District. As concerns the present study, Pearson et al. (1989:Table 5-2) listed a total of 131 wrecks in what they termed the "Atchafalaya Area." This included 52 wrecks in the Atchafalaya River, 14 in Bayou Plaquemine, 9 at the mouth of Red River and 56 at "other" locations within their defined "Atchafalaya Area," essentially corresponding to the Atchafalaya Basin. They, also, recorded a total of 145 wrecks along Bayou Teche and its tributary waterways and 42 wrecks in the Gulf of Mexico. As Pearson et al. discuss at length in their study, the locational information on a very large number of the wrecks they include in their study is very imprecise. Thus, the numbers presented in the 1989 study can be seen as providing a starting point for looking at shipwreck occurrences within the study area, but they have to be viewed with caution.

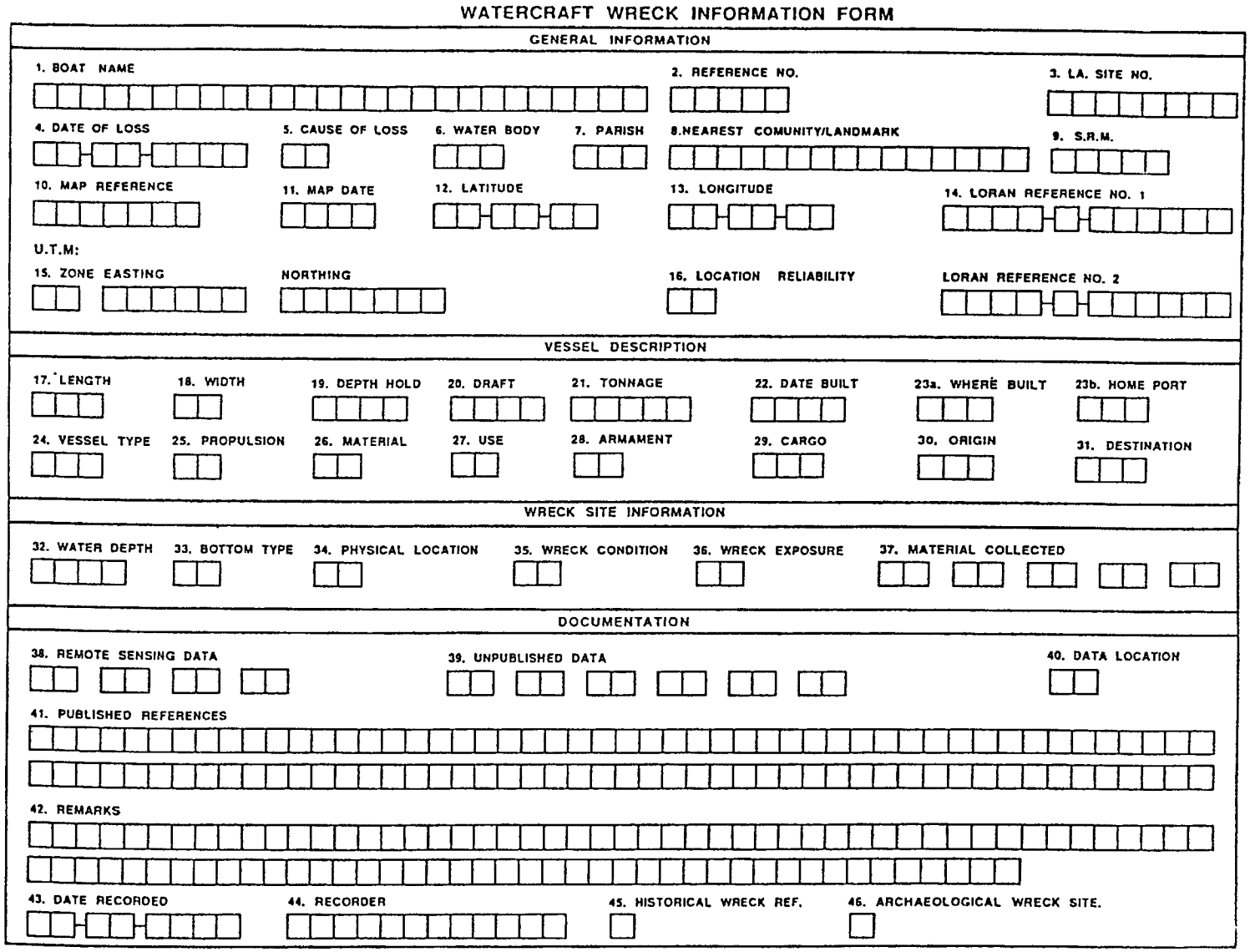


Figure 4-1. Watercraft wreck information form.

In the case of the recorded wrecks in Pearson et al's. "Atchafalaya Area" it is possible to immediately eliminate the 9 wrecks in the mouth of the Red River which fall well outside of the study area. Additionally, a number of the 145 wrecks located along Bayou Teche can be eliminated because they fall above the town of Jeanerette, and thus outside of the study area. One of the fields recorded for wrecks is "Nearest Community" which, in a number of cases, provides sufficient information to determine that a number of wrecks on Bayou Teche definitely fall outside of the study area. In many instances, for Bayou Teche and other waterbodies in the study area, nearest community is not available or the location given in historic accounts cannot be identified, such that some wrecks may be included within the study area which actually fall outside of it. The best source for specific information on historic wreck locations along Bayou Teche comes from an 1870 survey of the bayou undertaken by the C.W. Howell of the Corps of Engineers (Howell 1870). The maps produced by Howell identify many wrecks along Bayou Teche such that they can be placed within or eliminated from the study area. Many other accounts of boat losses along Bayou Teche, however, may simply give a location of loss as "Bayou Teche," such that the wreck cannot be eliminated. As noted, the same is true for other waterbodies in the study area, particularly the Atchafalaya River and the Gulf of Mexico.

Relying on the Pearson et al. (1989) data base, plus information collected in this study, a total of 295 boat wrecks are identified within the study area. Table 4-1 provides a listing of these losses. This number includes wrecks identified from historical, cartographic and archeological sources. As mentioned several times, many historical accounts must be considered to reflect "reported losses," which may or may not mean that an actual sinking happened. Often the contemporary records note only that the accident occurred, but do not indicate whether or not it resulted in a sinking. For the present, it is assumed a sinking did occur in the event of a serious accident or that portions of the vessel were lost at the accident site and potentially exist as archeological remains.

All of these various biases need to be kept in mind when considering the wreck list presented here, or when viewing any wreck list. In spite of these problems, however, Table 4-1 does provide the most complete wreck list for the study area yet compiled and it contains information that can be used to characterize the body of boat wrecks extant within the study area.

Table 4-1 incorporates only those attributes considered pertinent to the following discussions. These are vessel name, vessel type, date of loss, water body on which loss occurred, the nearest community, and the cause of loss. Complete information on each loss is included in the updated computerized database. The characteristics of these boat losses are discussed in the following sections.

The Sample of Boat Wrecks in the Study Area

Typology of Boat Wrecks

For the present study, the typology of boats provided in Pearson et al. (1989) was followed in classifying recorded wrecks. That study had identified 66 types of watercraft as wreck losses within the entire New Orleans District. Within the present study area, 31 types of watercraft, plus a large category of "unknowns" have been identified (Table 4-2). These types are derived primarily from historic references and do not always refer to or correlate with morphologically defined watercraft types as discussed in previous sections of this report. Descriptions of lost or wrecked vessels are often vague in the literature, and more precise information is generally found for the military vessels and for large commercial vessels than for smaller watercraft.

Some of the problems inherent in the boat typology used can be understood, although not always overcome because of the nature of the available data on losses. For example, nineteenth-century and early-twentieth-century losses listed as steamers (steamboats) were either sidewheel or sternwheel steamboats, but some could not be classified under these more specific categories on the basis of available historical information. These vessels have been classified simply as "steamboats," in the data base. Two losses identified as "towboats" occur in the study area (Table 4-2). This information is derived from documentary accounts of the losses and relates to how these vessels were being used. They may have been steamboats, but the references do not specify this. On the other hand, a number of the steamboats listed in Table 4-1 definitely were used as towboats, but this function will not be listed in the data record.

Of the 295 wrecks identified in the study area, 77 (26.1 percent) could not be identified as to vessel type. This compares fairly closely to the num-

Table 4-1. Boat Wrecks Recorded Within the Study Area.

Vessel Name	Vessel Type*	Date Lost	Waterbody in Which Vessel Was Lost	Nearest Community or Landmark	Cause of Loss
ALBERTA	BGE	8/25/1911	ATCHAFALAYA BAY	UNKNOWN	FOUNDERED
UNKNOWN	DRE	UNKNOWN	ATCHAFALAYA BAY	CALUMET	UNKNOWN
NANIOPE	SSW	9/15/1852	ATCHAFALAYA BAY	UNKNOWN	SNAGGED
CHARLES W. MACKIE	UNKNOWN	9/20/1909	ATCHAFALAYA BAY	RABBIT ISLAND	SANK IN STORM
UNKNOWN	UNKNOWN	UNKNOWN	ATCHAFALAYA BAY	BERWICK	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	ATCHAFALAYA BAY	BERWICK	UNKNOWN
103	BGE	0/0/1982	ATCHAFALAYA RIVER	BERWICK	UNKNOWN
SRT-1	BGE	0/0/1986	ATCHAFALAYA RIVER	KROTZ SPRINGS	UNKNOWN
SRT-9	BGE	0/0/1986	ATCHAFALAYA RIVER	KROTZ SPRINGS	UNKNOWN
UNKNOWN	BGE	UNKNOWN	ATCHAFALAYA RIVER	UNKNOWN	UNKNOWN
UNKNOWN	BGE	0/0/1985	ATCHAFALAYA RIVER	MORGAN ISLAND	UNKNOWN
KENNY	M/V	0/0/1979	ATCHAFALAYA RIVER	MORGAN CITY	UNKNOWN
SUSAN B	M/V	0/0/1986	ATCHAFALAYA RIVER	BERWICK	UNKNOWN
UNKNOWN	P/C	0/0/1983	ATCHAFALAYA RIVER	MORGAN CITY	UNKNOWN
WILLIAM SHAKESPEARE	SBT	10/28/1900	ATCHAFALAYA RIVER	ELMWOOD PLANT.	BURNED
ANNA	SSW	9/3/1852	ATCHAFALAYA RIVER	UNKNOWN	SNAGGED
ANY ONE	SSW	8/20/1869	ATCHAFALAYA RIVER	MORGAN CITY	FOUNDERED
DE SOTO	SSW	3/1/1844	ATCHAFALAYA RIVER	SHELL ISLAND	COLLISION
KINSMAN, U.S.S.	SSW	2/23/1863	ATCHAFALAYA RIVER	BERWICK	SNAGGED
MAJOR AUBRY	SSW	11/0/1858	ATCHAFALAYA RIVER	BERWICK	SNAGGED
OPELOUSAS	SSW	11/15/1857	ATCHAFALAYA RIVER	BERWICK	COLLISION
QUEEN OF THE WEST	SSW	4/14/1863	ATCHAFALAYA RIVER	MILLET POINT	EXPLOSION
SULTAN	SSW	10/25/1847	ATCHAFALAYA RIVER	UNKNOWN	SNAGGED
UNA	SSW	8/12/1867	ATCHAFALAYA RIVER	UNKNOWN	STRANDED & SWAMPED
THOMPSON	STB	UNKNOWN	ATCHAFALAYA RIVER	CYPRESS ISLAND	SNAGGED
ACTIVE	STW	1/29/1877	ATCHAFALAYA RIVER	MORGAN CITY	UNKNOWN
ARKLA	STW	6/16/1934	ATCHAFALAYA RIVER	PATTERSON	BURNED
CHARLIE H. DURFEE	STW	12/16/1878	ATCHAFALAYA RIVER	BIRD'S MILL	SNAGGED
HARRY HIGBEE	STW	7/24/1902	ATCHAFALAYA RIVER	PATTERSON	BURNED
HELEN LANE	STW	6/30/1919	ATCHAFALAYA RIVER	BERWICK	FOUNDERED
HURON	STW	2/23/1855	ATCHAFALAYA RIVER	UNKNOWN	SNAGGED
JENNIE LOUISE	STW	10/29/1913	ATCHAFALAYA RIVER	BERWICK	BURNED
LESSIE TAYLOR	STW	2/3/1878	ATCHAFALAYA RIVER	GLOVER'S POINT	SNAGGED
SONORA	STW	11/18/1865	ATCHAFALAYA RIVER	UNKNOWN	SNAGGED
SUGARLAND	STW	9/29/1915	ATCHAFALAYA RIVER	MORGAN CITY	FOUNDERED
PERCY DEAN	T/B	0/0/1979	ATCHAFALAYA RIVER	BERWICK	UNKNOWN
FIDGET	TOW	4/10/1884	ATCHAFALAYA RIVER	BERWICK	COLLISION
RESTLESS	TOW	4/10/1884	ATCHAFALAYA RIVER	BERWICK	COLLISION
ALTON	UNKNOWN	9/23/1914	ATCHAFALAYA RIVER	MORGAN CITY	BURNED

(continued)

Table 4-1. Continued.

Vessel Name	Vessel Type*	Date Lost	Waterbody in Which Vessel Was Lost	Nearest Community or Landmark	Cause of Loss
AZELIE	UNKNOWN	9/1/1915	ATCHAFALAYA RIVER	MORGAN CITY	BURNED
FAVORITE	UNKNOWN	9/29/1915	ATCHAFALAYA RIVER	PATTERSON	SNAGGED
HARNET	UNKNOWN	12/14/1888	ATCHAFALAYA RIVER	BIG BEND	SNAGGED
JIM	UNKNOWN	9/1/1879	ATCHAFALAYA RIVER	MORGAN CITY	BEACHED
JOHN WILSON	UNKNOWN	7/16/1882	ATCHAFALAYA RIVER	RICHARDS LANDNG	SNAGGED
LIZZIE E.	UNKNOWN	9/27/1888	ATCHAFALAYA RIVER	MORGAN CITY	STRANDED & SWAMPED
MARGARET	UNKNOWN	2/26/1877	ATCHAFALAYA RIVER	MILLET POINT	FOUNDERED
ONIDA	UNKNOWN	10/4/1893	ATCHAFALAYA RIVER	PATTERSON	FOUNDERED
UNKNOWN	FLB	UNKNOWN	BAYOU BLACK	UNKNOWN	UNKNOWN
GIPSY	SSW	2/19/1861	BAYOU BLACK	UNKNOWN	SNAGGED
SAINT JOHN	STB	2/18/1832	BAYOU BLACK	UNKNOWN	SNAGGED
UNKNOWN	STB	UNKNOWN	BAYOU BLACK	UNKNOWN	UNKNOWN
UNKNOWN	STB	UNKNOWN	BAYOU BLACK	UNKNOWN	UNKNOWN
DE DE	STW	3/27/1858	BAYOU BLACK	UNKNOWN	SNAGGED
SAMPSON	UNKNOWN	6/7/1899	BAYOU BLACK	UNKNOWN	BURNED
UNKNOWN	BGE	0/0/1981	BAYOU BOEUF	AVOCA ISLAND	UNKNOWN
SUZY	M/V	0/0/1982	BAYOU BOEUF	MORGAN CITY	UNKNOWN
UNKNOWN	FLB	0/0/1880	BAYOU DES GLAISES	HAMBURG	UNKNOWN
BOGUE HOUMA	STB	4/14/1843	BAYOU DES GLAISES	UNKNOWN	SNAGGED
R.M. JONES	UNKNOWN	UNKNOWN	BAYOU DES GLAISES	UNKNOWN	UNKNOWN
S.J. TRUBE	UNKNOWN	UNKNOWN	BAYOU DES GLAISES	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	0/0/1880	BAYOU DES GLAISES	HAMBURG	UNKNOWN
BDL 11	FLB	20th Century	BAYOU DULARGE	FOHS CANAL	ABANDONED
BDL 14	FLB	20th Century	BAYOU DULARGE	FOHS CANAL	ABANDONED
BDL 21	FLB	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 16	LFS	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 18	LFS	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 22	LFS	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 24	LFS	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 31	LFS	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 33	LFS	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 9	LFS	20th Century	BAYOU DULARGE	FOHS CANAL	ABANDONED
MISS KIRBIE	LFS	20th Century	BAYOU DULARGE	FOHS CANAL	ABANDONED
BDL 1	MLG	20th Century	BAYOU DULARGE	FALGOUT CANAL	ABANDONED
BDL 15	MLG	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 2	MLG	20th Century	BAYOU DULARGE	FALGOUT CANAL	ABANDONED
BDL 25	MLG	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED

(continued)

Table 4-1. Continued.

Vessel Name	Vessel Type*	Date Lost	Waterbody in Which Vessel Was Lost	Nearest Community or Landmark	Cause of Loss
BDL 27	MLG	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 3	MLG	20th Century	BAYOU DULARGE	FOHS CANAL	ABANDONED
BDL 32	MLG	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 36	MLG	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 4	MLG	20th Century	BAYOU DULARGE	FOHS CANAL	ABANDONED
CAPTAIN SCOTT	MLG	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 29	TRA	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 12	UNKNOWN	20th Century	BAYOU DULARGE	FOHS CANAL	ABANDONED
BDL 13	UNKNOWN	20th Century	BAYOU DULARGE	FOHS CANAL	ABANDONED
BDL 17	UNKNOWN	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 20	UNKNOWN	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 26	UNKNOWN	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 30	UNKNOWN	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
BDL 37	UNKNOWN	20th Century	BAYOU DULARGE	IMMACULATE CHURCH	ABANDONED
DULAC	UNKNOWN	11/24/1921	BAYOU DULARGE	THERIOT	BURNED
UNKNOWN	BGE	UNKNOWN	BAYOU GROSS TETE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU GROSS TETE	UNKNOWN	UNKNOWN
BAYOU GROSS TETE CANOE	DGC	UNKNOWN	BAYOU GROSS TETE	UNKNOWN	UNKNOWN
SUNBEAM	STW	2/4/1858	BAYOU PIERRE	UNKNOWN	SNAGGED
E.H. BARMORE	FER	UNKNOWN	BAYOU PIGEON	PLAQUEMINE	UNKNOWN
PANOLA	STB	6/28/1842	BAYOU PIGEON	UNKNOWN	SNAGGED
UNKNOWN	BGE	UNKNOWN	BAYOU PLAQUEMINE	PLAQUEMINE	UNKNOWN
BAYOU PLAQUEMINE CANOE	DGC	UNKNOWN	BAYOU PLAQUEMINE	PLAQUEMINE	UNKNOWN
MARY LOU	OSW	2/21/1933	BAYOU PLAQUEMINE	PLAQUEMINE	BURNED
ALEXANDER PORTER	SSW	3/9/1841	BAYOU PLAQUEMINE	PLAQUEMINE	SNAGGED
CINDERELLA	SSW	3/28/1841	BAYOU PLAQUEMINE	PLAQUEMINE	SNAGGED
MONTICELLO	SSW	3/29/1833	BAYOU PLAQUEMINE	PLAQUEMINE	SNAGGED
WATCHMAN	SSW	7/16/1836	BAYOU PLAQUEMINE	PLAQUEMINE	SNAGGED
BEAVER	STB	2/10/1844	BAYOU PLAQUEMINE	UNKNOWN	BURNED
BOIS d'ARC	STB	12/8/1847	BAYOU PLAQUEMINE	PLAQUEMINE	SNAGGED
CAROLINE	STB	0/0/1834	BAYOU PLAQUEMINE	PLAQUEMINE	SNAGGED
GALENIAN	STB	3/6/1839	BAYOU PLAQUEMINE	PLAQUEMINE	BURNED
OCTARARO	STB	2/21/1843	BAYOU PLAQUEMINE	PLAQUEMINE	SNAGGED
WATER WITCH	STB	0/0/1833	BAYOU PLAQUEMINE	PLAQUEMINE	SNAGGED
ANTON WILBERT	STW	9/3/1923	BAYOU PLAQUEMINE	PLAQUEMINE	BURNED
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU PLAQUEMINE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU PLAQUEMINE	PLAQUEMINE	UNKNOWN

(continued)

Table 4-1. Continued.

Vessel Name	Vessel Type*	Date Lost	Waterbody in Which Vessel Was Lost	Nearest Community or Landmark	Cause of Loss
16 SMY 55/56, Watercraft 3	BAT	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 61, Watercraft 1	BGE	19th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 55/56, Watercraft 2	FLB	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 55/56, Watercraft 8	FLB/Lafitte skiff	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 55/56, Watercraft 1	LFS	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 55/56, Watercraft 9	MLG	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 58	MSW	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 55/56, Watercraft 4	PIB	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 55/56, Watercraft 5	SKI	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 55/56, Watercraft 6	SKI	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 55/56, Watercraft 7	SKI	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 61, Watercraft 3	SKI	20th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
16 SMY 61, Watercraft 2	SLP	19th century	BAYOU SHAFFER	BATEMAN'S ISLAND	ABANDONED
UNKNOWN	P/C	0/0/1982	BAYOU SORREL	LOWER GRAND RIVER	UNKNOWN
BERTRAND	SSW	1/11/1850	BAYOU SORREL	UNKNOWN	SNAGGED
CAMDEN	BGE	UNKNOWN	BAYOU TECHE	WAX LAKE OUTLET	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	GARDEN CITY	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	WAX LAKE OUTLET	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	AVALON	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	AVALON	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	AVALON	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	BGE	0/0/1985	BAYOU TECHE	PATTERSON	UNKNOWN

(continued)

Table 4-1. Continued.

Vessel Name	Vessel Type*	Date Lost	Waterbody in Which Vessel Was Lost	Nearest Community or Landmark	Cause of Loss
UNKNOWN	BGE	0/0/1976	BAYOU TECHE	CENTERVILLE	UNKNOWN
UNKNOWN	BGE	0/0/1976	BAYOU TECHE	CENTERVILLE	UNKNOWN
UNKNOWN	BGE	0/0/1986	BAYOU TECHE	GARDEN CITY	UNKNOWN
UNKNOWN	BGE	0/0/1986	BAYOU TECHE	GARDEN CITY	UNKNOWN
UNKNOWN	BGE	0/0/1986	BAYOU TECHE	GARDEN CITY	UNKNOWN
UNKNOWN	BGE	0/0/1986	BAYOU TECHE	GARDEN CITY	UNKNOWN
UNKNOWN	BGE	0/0/1986	BAYOU TECHE	GARDEN CITY	UNKNOWN
UNKNOWN	BGE	0/0/1986	BAYOU TECHE	GARDEN CITY	UNKNOWN
UNKNOWN	BGE	0/0/1982	BAYOU TECHE	LINWOOD	UNKNOWN
UNKNOWN	BGE	0/0/1984	BAYOU TECHE	BALDWIN	UNKNOWN
HUDSON	CNB	UNKNOWN	BAYOU TECHE	CENTERVILLE	UNKNOWN
DREDGE #4	DRE	0/0/1978	BAYOU TECHE	BAYOU VISTA	UNKNOWN
UNKNOWN	FER	UNKNOWN	BAYOU TECHE	GARDEN CITY	UNKNOWN
UNKNOWN	FLB	UNKNOWN	BAYOU TECHE	CHARENTON	UNKNOWN
UNKNOWN	FLB	UNKNOWN	BAYOU TECHE	KATY	UNKNOWN
UNKNOWN	FLB	UNKNOWN	BAYOU TECHE	FRANKLIN	UNKNOWN
UNKNOWN	FLB	UNKNOWN	BAYOU TECHE	HANSON CANAL	UNKNOWN
UNKNOWN	GBT	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	GBT	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
GILLETS	LIG	UNKNOWN	BAYOU TECHE	FRANKLIN	UNKNOWN
UNKNOWN	LIG	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
SOUTHERN LADY	PDB	0/0/1985	BAYOU TECHE	BAYOU VISTA	UNKNOWN
UNKNOWN	RFT	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
ESSEX	SCH	UNKNOWN	BAYOU TECHE	FRANKLIN	UNKNOWN
FOOTE	SCH	UNKNOWN	BAYOU TECHE	GARDEN CITY	UNKNOWN
JOHN BOWLES	SCH	UNKNOWN	BAYOU TECHE	AVALON	UNKNOWN
UNKNOWN	SCH	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	SCH	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	SCH	UNKNOWN	BAYOU TECHE	FRANKLIN	UNKNOWN
UNKNOWN	SCH	UNKNOWN	BAYOU TECHE	WAX LAKE OUTLET	UNKNOWN
UNKNOWN	SCH	UNKNOWN	BAYOU TECHE	AVALON	UNKNOWN
AJAX	SSW	5/3/1841	BAYOU TECHE	JEANERETTE	SNAGGED
ANNA E.	SSW	11/15/1871	BAYOU TECHE	UNKNOWN	SNAGGED
BUCKEYE	SSW	3/1/1844	BAYOU TECHE	PATTERSON	COLLISION
COTTON	SSW	1/14/1863	BAYOU TECHE	FRANKLIN	BURNED
DIANA, C.S.N.	SSW	4/12/1863	BAYOU TECHE	FRANKLIN	BURNED
EFFORT	SSW	9/3/1838	BAYOU TECHE	FRANKLIN	SNAGGED

(continued)

Table 4-1. Continued.

Vessel Name	Vessel Type*	Date Lost	Waterbody in Which Vessel Was Lost	Nearest Community or Landmark	Cause of Loss
TOM SUGG (TECHE)	SSW	0/0/1868	BAYOU TECHE	UNKNOWN	FOUNDERED
WARREN BELLE	SSW	2/6/1870	BAYOU TECHE	UNKNOWN	SNAGGED
BLUE HAMMOCK	STB	4/14/1863	BAYOU TECHE	UNKNOWN	SCUTTLED
DARBY	STB	4/14/1863	BAYOU TECHE	UNKNOWN	SCUTTLED
ERA NO. 2	STB	4/14/1863	BAYOU TECHE	HANSON CANAL	UNKNOWN
FLYCATCHER	STB	4/14/1863	BAYOU TECHE	AVALON	SCUTTLED
IBERIA	STB	UNKNOWN	BAYOU TECHE	LOREAUVILLE CNL	UNKNOWN
J.B. CHAUVIN	STB	11/8/1916	BAYOU TECHE	UNKNOWN	BURNED
LOUISE	STB	4/14/1863	BAYOU TECHE	UNKNOWN	SCUTTLED
MARIE A.	STB	3/7/1886	BAYOU TECHE	CHARENTON	FOUNDERED
MONNER	STB	UNKNOWN	BAYOU TECHE	JEANERETTE	UNKNOWN
MUDDIGGER	STB	UNKNOWN	BAYOU TECHE	AVALON	UNKNOWN
PLOUGHBOY	STB	1839	BAYOU TECHE	UNKNOWN	EXPLODED
SULL RUSK	STB	UNKNOWN	BAYOU TECHE	HANSON CANAL	UNKNOWN
TEXAS	STB	UNKNOWN	BAYOU TECHE	FRANKLIN	UNKNOWN
UNCLE TOMMY	STB	4/13/1863	BAYOU TECHE	UNKNOWN	SCUTTLED
UNION	STB	UNKNOWN	BAYOU TECHE	OXFORD	UNKNOWN
UNKNOWN	STB	UNKNOWN	BAYOU TECHE	HANSON CANAL	UNKNOWN
UNKNOWN	STB	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
CRICKET	STW	4/14/1863	BAYOU TECHE	UNKNOWN	SCUTTLED
GOSSAMER	STW	4/13/1863	BAYOU TECHE	HANSON CANAL	SCUTTLED
GRAND	STW	5/17/1921	BAYOU TECHE	UNKNOWN	BURNED
JOHN M. CHAMBERS	STW	7/24/1884	BAYOU TECHE	UNKNOWN	SNAGGED
MARY F. GOLDEN	STW	1/28/1908	BAYOU TECHE	AVALON	BURNED
MINK	STW	12/1/1878	BAYOU TECHE	UNKNOWN	BURNED
NEWS BOY	STW	4/14/1863	BAYOU TECHE	HANSON CANAL	SCUTTLED
SEWANEE	STW	11/18/1932	BAYOU TECHE	PATTERSON	BURNED
CLARA P.	UNKNOWN	11/12/1910	BAYOU TECHE	ANNA PLANTATION	BURNED
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	AVALON	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN

(continued)

Table 4-1. Continued.

Vessel Name	Vessel Type*	Date Lost	Waterbody in Which Vessel Was Lost	Nearest Community or Landmark	Cause of Loss
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	UNKNOWN	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	BAYOU TECHE	FRANKLIN	UNKNOWN
RUBY KAY	F/V	0/0/1976	BAYOU TERREBONNE	BOURG	UNKNOWN
SADIE DOWNMAN	STW	6/15/1913	BAYOU TERREBONNE	HOUMA	BURNED
UNKNOWN	P/C	0/0/1985	BELLE RIVER	LAKE VERRET	UNKNOWN
F.B. WILLIAMS	STW	1/13/1912	BELLE RIVER	UNKNOWN	BURNED
J.E. TRUDEAU	STW	0/0/1921	BELLE RIVER	UNKNOWN	BURNED
UNKNOWN	UNKNOWN	UNKNOWN	BERWICK BAY	MORGAN CITY	UNKNOWN
UNKNOWN	BGE	0/0/1971	FLAT LAKE	ST. MARTIN PARISH	UNKNOWN
BAYOU QUEEN	H/B	0/0/1976	GIWW	AVOCA ISLAND	UNKNOWN

(continued)

Table 4-1. Continued.

Vessel Name	Vessel Type*	Date Lost	Waterbody in Which Vessel Was Lost	Nearest Community or Landmark	Cause of Loss
LA-2694-AY	P/C	0/0/1984	GIWW	ST. MARY PARISH	UNKNOWN
UNKNOWN	P/C	0/0/1979	GIWW	HOUMA	UNKNOWN
UNKNOWN	P/C	0/0/1978	GIWW	ST. MARY PARISH	UNKNOWN
DANIEL BOONE	UNKNOWN	9/1/1879	GRAND LAKE	UNKNOWN	FOUNDERED
DOMENICA TODESCO	UNKNOWN	10/1/1893	GRAND LAKE	UNKNOWN	COLLISION
F & J	UNKNOWN	9/29/1915	GRAND LAKE	UNKNOWN	FOUNDERED
ONIDA	UNKNOWN	10/10/1897	GRAND LAKE	UNKNOWN	FOUNDERED
GREY EAGLE	SSW	1/18/1850	GRAND RIVER	UNKNOWN	SNAGGED
LODI	SSW	12/27/1845	GRAND RIVER	UNKNOWN	SNAGGED
F.M. OWENS	STW	0/0/1915	GRAND RIVER	UNKNOWN	UNKNOWN
G.W. ANDERSON	STW	UNKNOWN	GRAND RIVER	PLAQUEMINE	UNKNOWN
OSCAR	UNKNOWN	8/10/1891	GRAND RIVER	UNKNOWN	FOUNDERED
UNKNOWN	GLN	8/18/1879	GULF OF MEXICO	ISLES DERNIERIES	SANK IN STORM
UNKNOWN	GLN	0/0/1781	GULF OF MEXICO	MARSH ISLAND	UNKNOWN
LIZZIE HAAS	SCH	12/11/1902	GULF OF MEXICO	WINE ISLAND	FOUNDERED
THISTLE	SCH	10/25/1877	GULF OF MEXICO	TIMBALIER ISLAND	FOUNDERED
MERCHANT	SSW	10/3/1842	GULF OF MEXICO	WEST TIMBALIER ISLAND	FOUNDERED
NAUTILUS	SSW	8/10/1856	GULF OF MEXICO	ISLES DERNIERIES	STRANDED & SWAMPED
NEW YORK	SSW	9/5/1846	GULF OF MEXICO	UNKNOWN	FOUNDERED
STAR	SSW	8/10/1856	GULF OF MEXICO	ISLES DERNIERS	STRANDED & SWAMPED
TRINITY	SSW	11/26/1851	GULF OF MEXICO	ISLES DERNIERS	STRANDED & SWAMPED
JERRY	UNKNOWN	5/10/09	GULF OF MEXICO	TIMBALIER ISLANDS	FOUNDERED
UNKNOWN	UNKNOWN	UNKNOWN	GULF OF MEXICO	MARSH ISLAND	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	GULF OF MEXICO	MARSH ISLAND	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	GULF OF MEXICO	MARSH ISLAND	UNKNOWN
UNKNOWN	UNKNOWN	UNKNOWN	GULF OF MEXICO	POINT AU FER	UNKNOWN
SWAN	STB	4/4/1838	LAKE CHICOT	ST. MARTIN PARISH	FOUNDERED
NORA	STW	4/18/1898	LAKE NATCHEZ	UNKNOWN	STRANDED & SWAMPED
CHANCELLOR	UNKNOWN	4/30/1841	OYSTER BAYOU	CAILLOU BAY	UNKNOWN
UNKNOWN	BGE	0/0/1983	SIX MILE LAKE	CYPRESS ISLAND	UNKNOWN
UNKNOWN	BGE	0/0/1983	SIX MILE LAKE	CYPRESS ISLAND	UNKNOWN
COLUMBIA	SSW	2/27/1910	SIX MILE LAKE	UNKNOWN	STRANDED & SWAMPED
LAKE 2	BGE	0/0/1979	WAX LAKE OUTLET	BAYOU TECHE	UNKNOWN
JARAD	M/V	0/0/1981	WAX LAKE OUTLET	WAX LAKE	UNKNOWN

*** See Table 4-2**

bers Pearson et al. (1989) present for the New Orleans District as a whole, where 594 (33 percent) of the 1,800 wrecks recorded could not be classified as to vessel type. The large category of unknowns derives from several factors. For one, a number of these losses come from information in various Annual Reports of the Chief of Engineers which often mention the occurrence or removal of "unidentified wrecks" or "wreckage." It is presently impossible to determine what type of watercraft are being referred to. However, if one looks at the wrecks which are actually identified in COE reports, the vast majority of them are barges and steamboats. It may be, then, that many of the unknown types in Table 4-1 derived from Annual Reports actually represent barges or steamboats. Presently, however, this cannot be verified.

Other vessels in the unknown type category are derived from boat wrecks depicted on historic maps. Maps, such as coastal navigation charts, will show the presence of wrecks, but will rarely provide information as to the type or identity of the vessel. Among the few exceptions to this are some of the maps derived from COE surveys in the nineteenth century. The 1870 map of Bayou Teche produced by C.W. Howell (Howell 1870) is one of these exceptions. This map depicts large numbers of wrecks along Bayou Teche, most of which are identified as to name or to type (e.g., "hull of a schooner" or "flatboat").

A small number of the wrecks listed in Table 4-1 are derived from recent cultural resources survey studies conducted within the study area. Two of these produced the majority of the archeological watercraft included in Table 4-1. These were the study by Pearson and Saltus (1991) which located a number of abandoned watercraft (mostly vernacular "folk" craft) along Bayou Shaffer, and a reconnaissance of abandoned and derelict watercraft conducted along Bayou du Large reported in Stout (1992). The majority of some types of boats and, in some cases, all of other types included in Table 4-1 are derived solely from these archeological data. For example, all of what are identified as "Motorized Luggers" are derived from data presented in these two studies. (Stout [1992] refers to all of these types of vessels simply as "luggers," but we have classified them as motorized luggers, primarily, in an effort to distinguish them from the earlier sailing luggers that operated in the area.) The same is true for all of the Lafitte skiff losses recorded for the study area. Luggers and Lafitte skiffs have been used in oystering and shrimping in the study area throughout this century, and many remain in use today. In fact, they have been among the most common vessel types operating in the southern portion of the study area over the past 100 to 120 years. The fact that they are recorded only as archeological entities is because they are common, everyday "folk craft" and their loss rarely elicits any kind of written record. Also, these types of vessels commonly end their lives in abandonment, an event that only rarely finds its way into newspapers or into the types of public documents that record vessel losses. Although these types of boats form a fairly small percentage of the recorded wrecks in the study area, as noted earlier, it is presumed that they, along with other folk craft such as skiffs, batteaus and pirogues, actually comprise the largest population of archeological wrecks in the region.

The category "barge" represents the most common type of vessel identified in the loss records for the study area, comprising 15.9 percent (n=47) of the total reported losses (Table 4-2). In the Pearson et al. (1989) study, barges comprised a similar high percentage of the total recorded losses (20 percent, N=247), but were the second most common type, exceeded by sidewheel steamboats which constituted 23 percent (N=278) of the total number of recorded wrecks. A number of the barges in the study area are recent wrecks, having been lost in the last 10 to 20 years, primarily along the man-made canals and waterways near the coast. Another fairly large number of the barge losses are derived from COE records of clearing and snagging operations, which sometimes mention removal of a "barge" or some number of "barges." More commonly, the earlier COE accounts use the term "flat" or "flat boat" and there is no doubt that this reference is to a barge-like craft.

A total of 32 "sidewheel steamboats," comprising 10.8 percent of the total number of recorded losses, is identified in the study area (Table 4-2). This represents the second most common vessel type. As noted previously, some number of the boats identified only as "steamboats" are certainly sidewheelers, but the data are lacking to make this specific identification. If the entire sample of steamboats are considered, they comprise one-third (n=89, 30.1 percent) of the total recorded losses in the study area. This number consists of the 32 sidewheel steamers, 27 (9.2 percent) sternwheel steamers, and 30 (10.2 percent) boats identified only as "steamboats."

Table 4-2. Wreck Counts by Vessel Type in the Study Area.

VESSEL CODE	VESSEL TYPE	COUNT	PERCENT
	Unknown	77	26.1
BAT	Bateau	1	0.3
BGE	Barge	47	15.9
CNB	Canal Boat	1	0.3
DGC	Dugout Canoe	2	0.7
DRE	Dredge	2	0.7
F/V	Fishing Vessel	1	0.3
FER	Ferryboat	2	0.7
FLB	Flat/Flatboat	11	3.7
GBT	Gunboat	2	0.7
GLN	Galleon	2	0.7
H/B	Hopper Barge	1	0.3
LFS	Lafitte Skiff	9	3.1
LIG	Lighter	2	0.7
MLG	Motorized Lugger	11	3.7
M/V	Motor Vessel	4	1.4
MSW	Mine Sweeper	1	0.3
OSW	Oil Stern Wheel	1	0.3
P/C	Pleasure Craft	6	2.0
PDB	Paddle Boat	1	0.3
PIB	Pirogue (Board)	1	0.3
RFT	Raft	1	0.3
SBT	Showboat	1	0.3
SCH	Schooner	10	3.4
SKI	Skiff	4	1.4
SLP	Sloop	1	0.3
SSW	Sidewheel Steamboat	32	10.8
STB	Steamboat	30	10.2
STW	Sternwheel Steamboat	27	9.2
T/B	Tugboat	1	0.3
TOW	Towboat	2	0.7
TRA	Trawler	1	0.3
Total		295	

The Pearson et al. (1989:Table 5-1) study, similarly, found that steamboats as a broad category comprised the largest number of recorded losses in the entire New Orleans District. Their wreck loss data contained 278 (23.1 percent) sidewheel steamboats, 222 (18.4 percent) steamboats, and 76 (6.32 percent) sternwheel boats. In that study, the three categories of steamboats comprised 47.8 percent of the total number of recorded losses, a considerably greater proportion than is found in the study area. A major reason for this is the inclusion of the Mississippi River in the Pearson et al. study, where very large numbers of steamboats operated and where great numbers were lost. Of some interest in comparing the two sets of data is the ratio of sternwheelers to sidewheelers. In the data from the study area, sternwheel steamboats represent 30.3 percent of all recorded steamboat losses, while sidewheelers rep-

resent 36.0 percent of the total. This compares with 13.2 percent sternwheel boats and 48.2 percent sidewheel boats presented in Pearson et al. (1989:Table 5-1) for all recorded steamboat losses in the New Orleans District. The larger proportion of sternwheel steamboat losses in the study area is seen as a true reflection of the relatively high number used their. Sternwheel boats were much more adaptable to the small, shallow and often sinuous channels found throughout much of the Atchafalaya Basin, than were sidewheelers. As a result they were, generally, more desirable for use in most of the study area than were sidewheelers.

A further example of the differences in the operations of sternwheelers and sidewheelers is seen in the steamboat losses reported for the Gulf of Mexico. Five identified steamboats are recorded to have gone down in the Gulf in, or very near, the presently identified study area (Table 4-1). All of these are sidewheelers, the type which was adapted to open ocean conditions. Sternwheel boats found it very difficult to operate in ocean settings because, as the boat was rocked by waves, the paddlewheel would be picked up out of the water, losing traction.

As seen in Table 4-1, there are 2 "Gunboats" identified as losses in Bayou Teche. Information on these gunboats comes from the 1872 Annual Report of the Chief of Engineers discussing clearing operations undertaken along Bayou Teche. That report notes only that the wrecks of two unidentified gunboats were removed (CE 1872:578). These certainly represent the remains of two of the vessels scuttled along the bayou during the Civil War, but which ones cannot be ascertained. It is very possible, then, that these two unidentified gunboats duplicate two of the entries in Table 4-1 of identified steamers scuttled along Bayou Teche.

Each of the other types of watercraft reported as lost in the study area occur in very small numbers (Table 4-2). As can be seen in Table 4-1, there is an obvious lack of record for small craft of all sorts in the wrecks reported. As has been noted, the larger, commercial vessels, particularly steamboats, are the types which tend to be recorded when lost. It is apparent, then, that there is a serious discrepancy between the historic record of boat use in the study area and the historic record of boat loss in the area. The discrepancy between actual vessel losses and reported vessel losses has been observed in previous research (Detro et al. 1979; Pearson et al. 1989).

Causes of Loss

A variety of natural and man-induced forces resulted in the loss of vessels within the study area. Natural forces included storms, particularly, along the Gulf coast, and the many hazards found along the area's inland waterways, such as snags, logs and sandbars. As used here, man-induced actions leading to loss include explosions and fires on steamboats, losses due to war-related actions, and abandonment. It is, of course, not always possible to easily separate natural from man-induced causes. For example, fires on a steamboat often occurred after the boat struck an obstruction, dislodging the boilers or steam pipes. Also, abandonment is an action which is rarely recorded for a specific vessel, although we know that abandonment must account for the existence of a fairly large proportion of the wrecks which currently exist within the study area. Saltus, in a series of studies along waterways on the north shore of lake Pontchartrain (Saltus 1985, 1986, 1987, 1988) and Pearson and Saltus (1996) in a study of the lower Pearl River, have demonstrated that many, in fact the majority, of extant wrecks are known or presumed to have resulted from purposeful abandonment. Within the study area the few archeological watercraft sites that have been studied all appear to have resulted from abandonment. These include the several wooden boats identified along Bayou Shaffer by Pearson and Saltus (1991), the Morgan City Floodwall boat reported by Goodwin and Selby (1984), and the boats recorded by Stout (1992) along Bayou du Large. Additionally, many of the boats scuttled in the study area, particularly along Bayou Teche, during the Civil War, represent a form of purposeful abandonment.

As shown in Table 4-1, information on cause of loss has been determined for 144 boats in the study area. Forty two of these vessels are recorded as having been abandoned. Every case of reported abandonment is derived from cultural resources investigations and the boats can best be considered as archeological sites. These cases of abandonment are either those located along Bayou du Large by Stout (1992) or those along Bayou Shaffer by Pearson and Saltus (1991). Many more abandoned vessels of all ages and a variety of types certainly exist within the study area.

Although a single cause of loss is used in Table 4-1, many vessel losses involved combinations of several of these causes. For instance, as noted, the shock of striking a snag could cause the boilers on

a steamboat to shift and explode, leading to a fire. For the purposes of this report, the determination of the primary cause of the boat loss is, in certain instances, a matter of interpretation of the available records.

Causes of Steamboat Losses

More information is available on cause of loss for steamboats than for any other category of vessel in the study area. One of the reasons for this is simply due to the large number of steamboat losses recorded for the area, but it is also because the loss of a steamboat commonly elicited a considerable amount of interest due to the actual or potential threat to life and property. This interest, commonly, was reflected in a record of the loss in official documents as well as in newspaper accounts. Some data are available on the causes of steamboat losses on western rivers and it is worth discussing the factors contributing to these losses in comparison with the steamboat loss information from the study area.

Table 4-1 indicates that no steamboats were lost to abandonment, however, it is presumed that in the study area some steamers would have been abandoned but this fact was never recorded in the usual sources. Abandonment, possibly, was less common for steamboats than of other types of vessels, such as keelboats, barges, and the like, or small folk craft, such as skiffs and batteaus. Sometimes, however, old, damaged or unserviceable steamboats were taken to an out-of-the-way area, abandoned and allowed to deteriorate and sink. Extant records may indicate that a boat was "off the lists" by a particular date, with no indication as to what actually became of it. Many of these reports of vessels off the list probably relate to abandonment or dismantling. In instances of abandonment, one would expect that most of the valuable machinery and other items would have been removed from the boat prior to total abandonment. Currently available information on archeologically examined abandoned vessels shows that abandonments tend to be concentrated at or near landings and settlements (Pearson and Saltus 1996; Saltus 1985, 1987). Thus, the future discovery of abandoned steamboats might be aided by the identification of historic landings through a review of historical and cartographic records. However, the discovery of abandoned steamboat remains in the study area, ultimately, will have to rely on actual physical searches, such as cultural resources surveys, rather than on the historical record.

The historical record does, however, provide considerable information on other causes leading to steamboat losses. As much a part of steamboat travel as food and accommodations, were hazards that threatened life and property. Any traveler who read newspaper headlines could not help but be conscious of the death and destruction occurring in steamboat accidents. There are no government compilations listing the number of steamboats lost during the first half of the nineteenth century, but several studies have attempted to address this question. One account (Hunter 1949) reported 995 mishaps from 1817 to 1852 from the following causes: collisions (44), fires (166), explosions (209), snaggings and obstructions (579). As the numbers indicate, most steamboats sank by colliding with snags or other river obstructions. That type of accident resulted in fewer human casualties than boiler explosions, primarily because the snagged boats could often reach the bank. Snags, however, caused more property destruction than boiler explosions. Of all steamboat accidents, boiler explosions took the highest toll in human life—higher than snags or fires. During the first three decades of western steamboating, at least 185 boilers exploded and caused fatalities.

In another study of steamboat accidents, Brown (1989:13) notes that between 1807 and 1853 over 7,000 people died in steamboat fires, sinkings, collisions, and explosions. Explosions comprised only about 25 percent of the fatalities, but they were the most frightening threat of steamboat travel and had the greatest impact on public perception. The year 1838 was a particularly bad year; 12 explosions occurred killing 342, injuring 29, and causing $180,000 in property losses (Brown 1989:Table One).

Snags, which were the primary cause of steamboat losses during much of the nineteenth century, were tree trunks that had fallen into a river with one end lodged in the riverbed and the other extending toward the surface of the water. They were irregularly shaped and as heavy as 75 tons. The "limb stubs" of a snag were known as "sawyers" or "planters." Sawyers rose and sank below the water's surface. Planters stayed lodged in the riverbed below the water's surface. Boats usually incurred more serious damage when hitting a snag going down river than upriver because they were moving at greater speed (Dunbar 1915:300-301).

Snags, boiler explosions, and other mechanical malfunctions would probably not have caused even half of the steamboat losses attributed to them, if

there had been no neglectful handling, shoddy workmanship, and racing. The term "hot engineer" came into use to describe engineers who deliberately refused to monitor water and steam gauges, if any were used. Pressure was often increased by hanging a weight on the safety valve. "Close pilots" were those who allowed steam pressure to build to a dangerously high level before pulling away or while racing with other boats. Such practices led to spectacular accidents killing hundreds of people and destroying thousands of dollars of property. Although such disasters shocked the public and resulted in repeated legislation at the state and local level to make them safer, in reality steamboating was probably not any less safe than other forms of pre-Civil War transportation.

Because of the many dangers and accidents associated with steamboating, insurance rates on steamboats rose to such an extent that many of their owners dropped their coverage, refused to buy insurance, or opted to cover only part of a boat's cost. J.L. Wilmers of Neare, Gibbs and Co., River Marine Underwriters, Cincinnati, Ohio, estimated that for steamboats five years old or less, 45 percent carried insurance between 1830 and 1850, and 80 percent carried insurance after 1850. A lower percentage of vessels over age five was insured (Haites et al. 1975:30).

The terrible nature of the accidents occurring on steamboats soon resulted in legislation aimed at making steamboat travel safer. In 1826 the state of Alabama passed the first steamboat regulation law. This act mandated annual inspections and licenses for steamboats by a board composed of the "harbormaster and wardens" at Mobile and in all suits for damages, laid the burden of proof with the carrier (Brown 1989:19). In 1833, while enroute from New Orleans, the steamboat *Lioness* exploded and sank on the Red River when a cargo of gunpowder on board caught fire. A number of prominent Louisiana citizens were killed, including U.S. Senator J. Stoddard Johnson. The consequence of this dramatic event was an 1834 Louisiana law intended to make river travel safer. Provisions of the law provided for periodic safety inspection of the boat, cargo and machinery, regulations on gunpowder shipments, a signal system, and the use of chain for the tiller rope (Acts of Louisiana 1834:55-59). The Louisiana law was among the most exacting of the state statutes passed. It required hydrostatic testing of boilers every three months, uninspected vessels were barred from insurance claims and boat captains could be charged with manslaughter for any death resulting from an explosion (Brown 1989:20). Soon, other western states passed steamboat safety laws. However, as Brown (1989) notes, many of these laws were not rigorously enforced or were unenforceable. One of the major problems concerned the jurisdiction that individual states had over vessels that were involved in interstate commerce.

In 1838, legislation was enacted at the federal level for the purpose of improving steamboat safety. The legislation required steamboat owners to employ qualified engineers or be held accountable if injury to property or personnel resulted from bursting boilers or breakdowns of machinery. In order to reduce the likelihood of boiler explosions, another provision mandated the opening of safety valves on boilers whenever a vessel was stopped for any reason, including when taking on or "discharging cargo, fuel, and passengers." To help reduce the likelihood of collisions with other vessels, signal lights were to be illuminated between dawn and dusk.

The hull, boilers, and machinery were to be inspected periodically by examiners appointed by district judges at ports of entry. They were empowered to issue "certificates" stating the condition of boilers and their age. Two copies of the certificate were to be given to the owner or master of the vessel, one of which the owner was to present to a customs official when "applying or renewing" his operating license. Failure to obtain a license and inspection certificate subjected the owner to a fine and seizure of the boat. The law failed to make the operation of boilers any safer because it did not require a hydraulic test, the only reliable means of ascertaining their capacity (Haites et al. 1975:109). State and federal legislation probably enhanced safety to some degree, but it did not render steamboat travel free from accident, and travel in the study area and on other western rivers remained dangerous and boats continued to be lost.

Amendments to the 1838 legislation, in 1843 and 1852, focused on fire protection. An 1843 statute mandated the installation of an additional steering apparatus that could be used to guide the boat if fire prevented anyone from reaching the wheel. The 1852 law set forth various fire prevention measures. Such highly flammable substances as gunpowder, turpentine, oil of vitriol, and camphene were not permitted on board without a permit from inspectors. Other provisions described the manner in which those substances were to be packed and labeled, and

how far they were to be kept from pipes, boilers, machinery, and other sources of heat. The five years following the passage of the 1852 legislation witnessed a great reduction in the number of people killed in steamboat explosions, 131 compared to 1,155 in the previous five years (United States Congress 1857:213). Over time, steamboat losses continued to decrease as the technology of steam engines improved and as navigation hazards were removed from the country's rivers.

Of the 89 steamboats identified as lost in the study area, 36.0 percent (n=32) were lost to snags, the single most common cause of loss listed in the available records (Table 4-3). If the 6 vessels which were "stranded and swamped" can, also, be presumed to have been lost to general river obstructions, then 47.2 percent of the steamboat sinkings can be attributed to snags and obstructions. The second most common cause of reported steamboat losses was burning (n=16, 18.0 percent), followed by foundering (n=8, 9.0 percent), scuttling (n=8, 9.0 percent), collisions (n=3, 3.4 percent), and explosions (n=2, 2.2 percent). Fourteen steamboats were lost to unknown causes (see Table 4-3).

In general, the causes of steamboat sinkings in the study area mirror those for other western waterways. Snagging and river obstructions were everywhere the single most common cause of steamboat sinkings. In fact, the first steamboat reported to have been lost in the study area was the small, 85-ton sidewheeler *Saint John*, sunk by a snag in 1832 on Bayou Black. Relying on known causes of loss only, Hunter (1949) reported that snagging and river obstructions accounted for just over 48 percent of steamboat losses on western rivers prior to 1852. For the 363 steamboats lost on Red River, Pearson and Wells (1999:4-22–25) note that snagging accounted for 28 percent of all reported losses and 46.9 percent of losses due to known causes, very similar to Hunter's figure. In the present study area, snaggings, also, represent the single most common cause of steamboat loss, accounting for 36.0 percent of all reported losses and 42.6 percent of losses due to known causes. This figure would be slightly higher if strandings are included, as Hunter seems to have done with his data. The critical fact is that the study area differed little from other western rivers in terms of boat losses due to snaggings over the entire period of steamboat activity.

Pearson and Wells (1999:Figure 4-10) did find that snaggings had accounted for about 52.3 percent of known steamboat losses on Red River in the years prior to 1852, a slightly higher proportion than Hunter had found for all western rivers for the same period. Pearson and Wells (1999) attribute this slightly higher figure to the Red's natural conditions, which were very conducive to snag formation. Within the study area, snagging accounted for 19 of the 28 reported steamboat losses occurring from known causes prior to 1852. This number represents 67.9 percent of the steamboat sinkings, higher than reported for the Red River or for western rivers in general. This may support the idea that during the first half of the nineteenth century snags were a greater danger in the study area than on other waterways, seemingly

Table 4-3. Reported Causes of Loss for Steamboats in the Study Area.

CAUSE OF LOSS	COUNT	PERCENT OF ALL BOAT LOSSES	PERCENT OF STEAMBOAT LOSSES
SNAGGED	32.00	36.0	42.7
BURNED	16.00	18.0	21.3
SCUTTLED	8.00	9.0	10.7
FOUNDERED	8.00	9.0	10.7
STRANDED & SWAMPED	6.00	6.7	8.0
COLLISION	3.00	3.4	4.0
EXPLODED	2.00	2.2	2.7
UNKNOWN	14.00	15.7	18.7
TOTAL	**89.00**	**100.00**	**100.00**

a reasonable conclusion considering the many small, shallow and snag-filled channels known to have existed in the area during the early years of steamboat travel. The danger of snagging decreased after the Civil War as activities to remove snags and obstructions were implemented or intensified.

Burning was the second most common reported cause of steamboat losses in the study area, accounting for 21.3 percent (n=16) of all losses due to known causes. This proportion is fairly similar to that reported for the Red River, where fire was also the second most common cause of steamboat losses, accounting for about 26 percent of all losses attributed to a known cause (Pearson and Wells 1999:Figure 4-1).

Almost everything about a steamboat was conducive to burning. The boats themselves were tinder-boxes built almost entirely of seasoned wood from the hull to the wheelhouse and much of the wood in a steamboat was pine that was painted with turpentine-based paints. Exacerbating the danger of fire were the cargos which were often dangerously flammable, and sometimes explosive, materials. Within the study area, cargos outbound from New Orleans often consisted of wooden barrels of flower, seed corn, kerosene, benzine, gunpowder, and other such things. Flammable and explosive cargo was often left exposed on deck and around passenger areas, despite laws requiring that they be covered with tarpaulins (Goodwin 1870:245). There were bundles of fabric, coils of rope, and stores of fuel for the ship. Downstream loads might have cotton bales stacked to the roof of the hurricane deck, and cotton seed in burlap bags stowed on that.

Sparks blew constantly from the tall smoke stacks, cinders blew around the fire boxes, and passengers and crew smoked cigars and pipes. Lights all over the boats were oil or kerosene and heat in the cabin was provided by wood burning stoves. Night landings were commonly lit by huge basket torchlights, which let clouds of burning sparks fly with the wind. After a fire started under these conditions there was little that could be done. The passenger deck and the long open galleries, some decorated with frilly woodwork, created a strong draft that could quickly spread a fire to all parts of the ship and whipped the fire to a high intensity. Early boats did not have fire hoses or pumps, relying instead on buckets to put out fires. Even after fire hoses and pumps were included as part of the usual equipment of a boat, they were not very effective.

When there was a fire, the safest thing for the pilot to do was to immediately head the boat to shore because a steamboat could burn to the waterline in minutes. But steering to shore was sometimes impossible because the hemp tiller ropes that passed from the pilot-house over much of the length of the boat to the rudders was exposed to fire (Hunter 1949:279). That problem was eventually dealt with by the use of iron chains in place of rope. Fatalities in steamboat fires were often high because few people knew how to swim, and there were rarely enough life boats on board to hold the passengers. Losses of life during steamboat fires could be terrible. In 1841, the steamboat *Creole* was on her way from Natchitoches to New Orleans with about 100 passengers, a full load of cotton, and $100,000 in specie. As the *Creole* was nearing the mouth of Red River it was discovered that she was on fire. The pilot steered the boat into shore, but she hit the bluff so hard that the bank collapsed and shoved the steamer back into the stream. By this time the tiller ropes were burned through and the boat drifted in the current and burned. Thirty six passengers and crew were killed and 31 more were injured (Lloyd 1856:174-175; Pearson and Wells 1999).

Of the 13 known steamboats lost in the study area during the Civil War, 8 were scuttled, 2 were burned, 1 was snagged on an obstruction, 1 exploded, and 1 was lost to an unknown cause. It should be noted that most of the vessels lost in the study area during the Civil War were purposefully scuttled to keep them out of enemy hands. Commonly, boats were burned to achieve this, however, they may have been simply reported as "scuttled." Also, as in the case of the *Queen of the West*, Civil War losses did occur as a result of enemy gunfire. However, explosion is given as the cause of loss of this boat, even though this ultimate cause of her sinking was brought about by gunfire.

Explosions account for only 2 of the steamboat losses in the study area. As already noted, one of these boats is the *Queen of the West,* the other is the steamer *Ploughboy*, reported lost in 1839. Explosions normally refer to boiler explosions, probably the cause of the *Ploughboy's* loss. Boiler explosions accounted for approximately 21 percent of all western steamboat accidents prior to 1852, but they were the most frightening threat of steamboat travel to the general public (Brown 1989; Hunter 1949:283). Boiler explosions commonly resulted in serious, often fatal, injury. During the first three decades of western steamboating, at least 185 boilers exploded causing

more than 1700 fatalities (Brown 1989:Table One). The engineers or firemen were nearly always among the victims. Even small explosions resulted in injuries and sometimes severe damage to the boat. Additionally, boiler explosions often resulted in fires, started by the hot coals that were spewed around the boat, compounding the tragedy. An idea of the terrible results of boiler explosions can be seen in the case of the steamer *Black Hawk*, lost to a boiler explosion in 1837. The steamer was loaded with passengers, possibly a hundred, and cargo, including ninety thousand dollars in specie belonging to the government. While running between Natchez and Natchitoches, at the mouth of Red River, the *Black Hawk*'s boilers exploded. All of the upper works forward of the wheels were blown off, causing an unknown number of fatalities, although it is known that the majority of passengers and crew were killed (Pearson and Wells 1999).

Losses due to boiler explosions are rare in the study area; the one possible account representing only about 1 percent of the total losses. For the Red River, Pearson and Wells (1999) report that boiler explosions, also, were fairly rare, accounting for only 4.1 percent of steamboat losses due to known causes. They did note, however, that for the pre-1852 period, boiler explosions accounted for 20.5 percent of steamboat losses, very close to the 21 percent reported by Hunter (1949) for the same period for all western rivers. For the study area, the single boiler explosions accounts for only 3.6 percent of the steamboat losses reported prior to 1852; still much lower than for other areas. The reasons behind the low number of boiler explosions in the study area are currently unknown.

Eight steamboats in the study area were lost due to "foundering," seemingly a relatively unusual event for a steamer. However, two of these losses were definitely in the waters of the Gulf of Mexico, not on inland rivers. Several of the other instances of foundering are reported to have occurred on the "Atchafalaya River," which could encompass the lakes on the lower part of the river. These lakes provided expansive bodies of water where conditions conducive to "foundering" existed. Losses due to collisions are reported only 3 times, representing 4.0 percent of losses due to known causes. Pearson and Wells (1999:Figure 4-1) report that collisions represented just over 8 percent of all steamboat losses on Red River, although the proportion was higher for the pre-1852 period. While many of the waterways in the study area appear to have been fairly conducive to collisions, considering how narrow and sinuous many channels were, collisions seem to have been relatively rare. Experience with the dangers of river travel led the pilots to develop an etiquette governing right-of-way, developing signal lights and whistle codes that were generally followed on all of the western rivers. Many of these informal rules, ultimately, were encoded into state and federal laws governing inland river traffic. Collisions did not always lead to boat loss, although damage could be extensive. Many collisions, of course, resulted in minimal damage and many of these will have gone unreported.

Average Life of Steamboats in the Study Area

As a result of the many dangers, steamboats on the western rivers had relatively short lives, averaging slightly more than four years in 1850 (Hunter 1949:101). This was in sharp contrast to the average life of sailing vessels which was on the order of 20 years or so. Hunter (1949:101) notes that of the 572 steamboats reported running on western waters in 1849 none were over 10 years old and only 22 were more than 5 years old. Eastern steamers lasted longer than those on western waters. In New York state in 1860 the average age of 170 steamboats was 8.7 years, while the 88 steamers inspected in Pittsburgh in that year averaged only 2.2 years old (Hunter 1949:101). Several factors contributed to the short life span of western river steamboats. Firstly, the navigation conditions on western rivers were dangerous, as attested to in the large number of losses due to snags as discussed earlier. Additionally, western river steamers were very lightly built and were easily damaged, plus they tended to be roughly handled by their captains and crews. Boats were commonly over loaded, they were often run when the water was too low, and the machinery was commonly pushed to its limits in order to make money. In addition, the technical knowledge and abilities of many of those working on western steamboats was rudimentary at best. The longevity of western river boats improved considerably in the latter part of the nineteenth century, in part due to technological advancements to steam machinery, but largely because of navigation improvements on the region's rivers.

Hunter (1949:101) has noted that the life span of boats on the Missouri River was particularly short because of the difficult navigation conditions found there. One question of interest in this study is whether or not the average life span of steamboats operating in the study area also differed from the norm. The

waterways of the study area, particularly those in the Atchafalaya Basin during the early years of steamboating, were very difficult to navigate because of the numerous log jams, snags, etc. The average life of steamboats lost in the study area was computed for three time periods: those lost prior to 1861, those lost during the Civil War, and those lost after the Civil War. Relying on those steamboats lost in each time period for which the date of build is known, it was found that the average life of the steamboats lost prior to 1860 (n=20) was 2.9 years; those lost during the Civil War (n=7) averaged 5.3 years in age, and those lost after the Civil War (n=17) averaged 10.5 years old.

These numbers correlate closely with data from other areas. For example, the 2.9 years average age of steamers lost prior to 1860 is only slightly less than the 3.5 years for steamboats lost on the Red River for the same time period (Pearson and Wells 1999:Figure 4-6) and the approximately 4 years suggested for Hunter (1949) for all western rivers for the period before circa 1850. It is almost that same as the 3 years which Hunter suggested was the average life of Missouri River boats in 1849 (Hunter 1949:101). The fact that the average age of early steamers in the study area was slightly less than those operating on many other western rivers may very well argue for greater hazards to navigation. This assumption seems to be supported by the relatively high proportion of steamboats lost to snags in the study area during the first half of the nineteenth century, as noted earlier.

Relying on boats lost, it is apparent that steamboats operating in the study area do show a significant increase in average lifespan through time. This is largely a reflection of navigation improvements undertaken on various waterways, particularly the activities of the Army Engineers which began in earnest in the early 1870s.

In contrast to the steamboats lost in the study area is the average age of sailing vessels lost there. Data are available for only three schooners, but these had an average life of 13.3 years, substantiating the well established fact that sailing vessels had much longer use lives than did steamboats.

Densities and Distributions of Wrecks in the Study Area

One of the principal goals of this study is to provide some spatial parameters to wreck occurrences within the study area. Very often, the specific location of a loss cannot be determined from the documentary records; the only information available may be the water body on which the loss occurred. In a few instances, however, very specific information on wreck locations is extant. Examples include the wreck information derived from archeological reports and those recorded along Bayou Teche on the 1870 Howell map. In order to characterize the entire population of known losses, however, the distribution and densities of reported losses must be discussed in a more general sense. This is done by looking at the number of losses by waterbody within the study area.

Table 4-4 presents counts of reported wrecks by waterbodies within three broad zones of the study area. These are 1) the Atchafalaya Basin, 2) the Coastal Area (essentially the area below Morgan City), and 3) the Gulf of Mexico. Not surprisingly, reported wrecks tend to occur more frequently along waterways with long histories of commercial activity, such as Bayou Plaquemine, Bayou Teche and the Atchafalaya River. However, the nature of the historical documentation available on wrecks in a particular area is a significant determinant of the quantity and types of wrecks recorded. For example, over 65 percent of the wrecks from the Coastal Area consist of the 43 abandoned boats reported in two cultural resources survey reports (Pearson and Saltus 1991; Stout 1992). Interestingly, for the two waterbodies examined in these studies, Bayou Shaffer and Bayou du Large, only a single historical account of a wreck was found. This was for a vessel named *Dulac*, lost in Bayou du Large. Another cultural resources study along Bayou Grand Caillou by Flayharty and Muller (1983) recorded a similarly large number of abandoned boats, while Pearson et al. (1989:254) note that not a single historic reference to vessels lost along the bayou was found in their study. (It should be noted that the boats recorded by Flayharty and Muller, apparently, fall just outside of the present study area.) These three cultural resources studies reveal the potential for wrecks in areas where very little historical wreck information exists. As more boat-oriented cultural resources surveys are conducted in this region, they will begin to offset the current biases that exist in the historical record of vessel losses.

In contrast, the very large number of wrecks reported along Bayou Teche were mostly recorded in historic documents, specifically the Annual Reports of the Chief of Engineers reporting on wreck removals and on the 1870 survey map by Howell (1870). The Chief of Engineers reports represent a

Table 4-4. Occurrences of Reported Wrecks by Waterbody Within the Study Area.

WATERBODY	COUNT
Atchafalaya Basin	**215**
Atchafalaya River	41
Bayou Des Glaises	5
Bayou Grosse Tete	3
Bayou Pierre	1
Bayou Pigeon	2
Bayou Plaquemine	16
Bayou Sorrel	2
Bayou Teche	125
Belle River	3
Flat Lake	1
Grand Lake	4
Grand River	5
Lake Chicot	1
Lake Natchez	1
Six Mile Lake	3
Wax Lake Outlet	2
Coastal Area	**66**
Atchafalaya Bay	6
Bayou Black	7
Bayou Boeuf	2
Bayou DuLarge	30
Bayou Shaffer	13
Bayou Terrebonne	2
Berwick Bay	1
Gulf Intracoastal Waterway	4
Oyster Bayou	1
Gulf of Mexico	**14**
TOTAL	**295**

listing of those vessels which were considered to be navigation hazards, many of which were reportedly removed. A recent remote-sensing survey undertaken along the lower parts of Bayou Teche seemed to suggest that COE wreck clearing activities did not always completely remove wrecks, but the study was unable to directly correlate remote-sensing targets with historic vessel locations as shown on 1870 Howell survey maps (Goodwin et al. 1991). The phenomena of wreck removal programs and their impact upon sunken vessels is discussed more fully below.

There are obvious differences in the distributions of recorded wrecks across time and space within the study area. Figure 4-2 presents information on numbers of recorded wrecks in the study area based on date of loss by decades. The data used consist only of those boats for which an actual date of loss is given. Information is provided for all boats and for steamboats alone, primarily, to allow comparisons with similar data presented in Pearson et al. (1989). One of the most striking aspects of Figure 4-2, is the lack of reported losses for the period from 1941 to 1970. This is entirely a reflection of the types of data examined in this study and is not a true measure of actual losses occurring in the study area. For example, many of the abandoned vessels identified along Bayou du Large by Stout (1992) may fall into this mid-twentieth century time period, but information on their date of abandonment is unavailable. Only two pre-1830 losses are recorded in the study area and both of these are sailing vessels lost in the Gulf of Mexico. Information on the actual location of loss of these vessels is not very reliable and they may or may not have wrecked within the bounds of the study area.

Reported boat losses in the study area show an increase up to about 1870, then a decrease to about 1900, then another increase to about 1920, followed by another decrease. Between 1830 and 1871, steamboat wrecks represent virtually all (over 90 percent) of the wrecks reported in the study area (Figure 4-2). Also, steamboat losses show an increase in the period from 1861 to 1870 and then a dramatic drop in the next decade, a fact related primarily to the number of boats lost during the Civil War. After the war, although there are fewer wrecks reported overall, the number of non-steamboat wrecks increases and, up to 1910, is actually greater than for steamboats. This phenomena, however, should be viewed with caution. Information as to boat type is lacking for a number of the boats lost during this period (see Table 4-1) and there is a very good possibility that some of them were steamboats.

The distribution of reported losses over time for the study area, shown in Figure 4-2, very closely resembles the data presented by Pearson et al. (1989:Figure 5-2) for reported wrecks in the entire New Orleans District. A primary difference is that the study area seems to show a proportionally greater increase in numbers of reported losses for the 1911-1920 period than did the Pearson et al. data.

The comparison of reported steamboat wrecks against total wrecks reveals several significant aspects of the nature of the vessel loss data base available for the study area. Steamboats constitute almost the

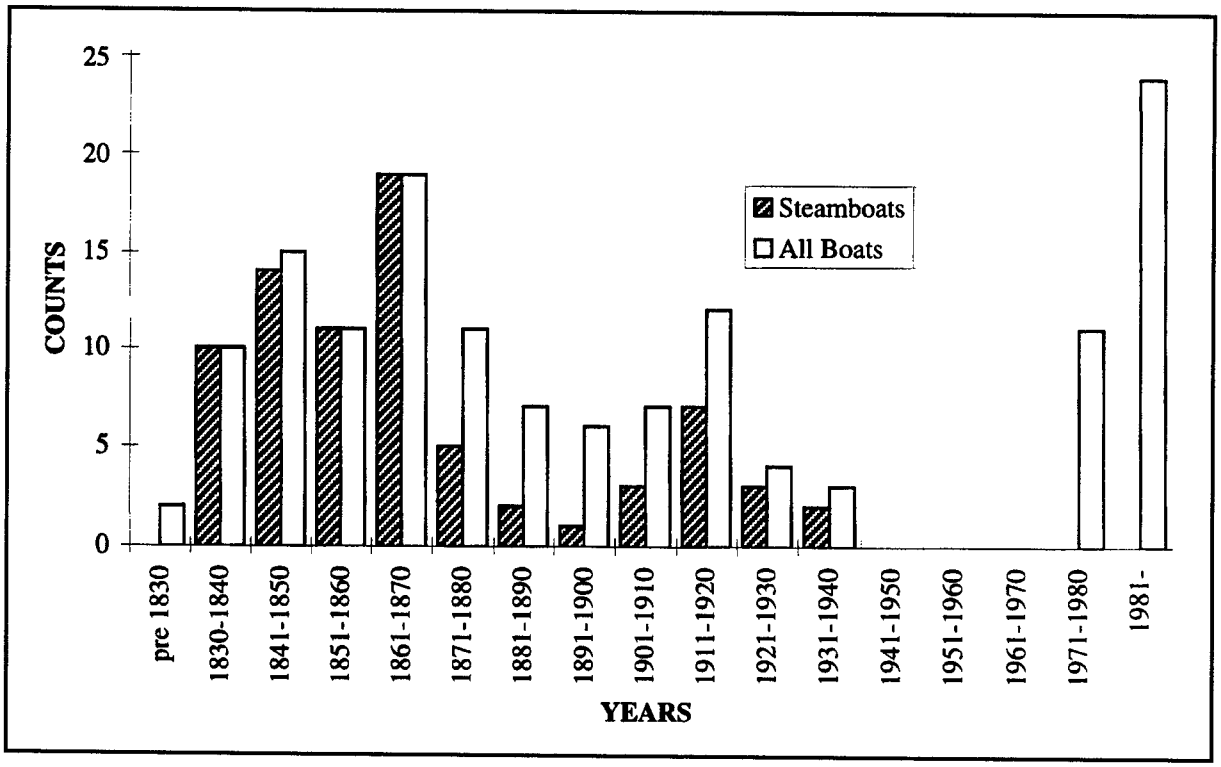


Figure 4-2. Reported losses of steamboats and all boats by decade.

entire record of losses prior to the Civil War. Only three references were found in this period for non-steamboat wrecks. No accounts of losses of boats such as barges, flatboats, keelboats, or pirogues exist for this period, despite the fact that they outnumbered steamboats in use by a significant amount, and, presumably, were lost in large numbers. Additionally, as noted, the divergence between total wrecks and total steamboat wrecks between the Civil War and 1920 is in large measure a reflection of the nature of data sources that become available in this period. Some of the non-steamboat wreck references during this period are found in the Annual Reports of the Chief of Engineers. If these navigation studies had also been conducted prior to the Civil War, then the number of non-steamboat wreck references for that period would also have been higher. Also, the sharp increase in numbers of wrecks reported during the Civil War is related to the greater detail in the documentation of losses of military vessels.

Table 4-5 provides information on the occurrence of reported wrecks by waterbody over time. The time interval used is 25 years. It was hoped that these data would show differential distributions of wrecks over time which could be correlated with known historical changes in usages of waterways. The information in Table 4-5 does show this phenomenon, but not very clearly. One of the reasons for this is that much of the available information on place of loss is so general as to be useless for associating a wreck with a specific historic navigation route. For instance, several wrecks are reported to have occurred in "Grand River." But, Grand River runs along almost the entire eastern side of the Atchafalaya Basin in the study area and an arm, known as Upper Grand River, extends westward from Bayou Plaquemine. Upper Grand River, in particular, served as an important steamboat route during the first half of the nineteenth century, but none of the documents examined listed wrecks specifically along Upper Grand River. The same, of course, is generally true for the Atchafalaya River, the principal navigable stream in the Atchafalaya Basin during the entire historic period.

Table 4-5 does, however, show some very general trends in the distribution of wrecks over time. For example, the Atchafalaya River not only shows the largest number of datable wrecks, but wrecks are reported there in each of the 25-year time intervals since 1825. The same is true for Bayou Teche. This is reflective of two phenomena; the overall intensity of waterborne commerce on these two streams

Table 4-5. Occurrences of Reported Wrecks by Waterbody by 25-Year-Time Periods.

WATERBODY	Pre 1825	1825-1850	1851-1875	1876-1900	1901-1925	1926-1950	1951-
Atchafalaya Basin		**22**	**25**	**21**	**20**	**3**	**28**
Atchafalaya River		2	10	11	7	1	8
Bayou Des Glaises		1	0	2	0	0	0
Bayou Grosse Tete		0	0	0	0	0	0
Bayou Pierre		0	1	0	0	0	0
Bayou Pigeon		1	0	0	0	0	0
Bayou Plaquemine		10	0	0	1	1	0
Bayou Sorrel		1	0	0	0	0	1
Bayou Teche		4	14	3	4	1	13
Belle River		0	0	0	2	0	1
Flat Lake		0	0	0	0	0	1
Grand Lake		0	0	3	1	0	0
Grand River		2	0	1	1	0	0
Lake Chicot		1	0	0	0	0	0
Lake Natchez		0	0	1	0	0	0
Six Mile Lake		0	0	0	1	0	2
Wax Lake Outlet		0	0	0	0	0	2
Coastal Area		**2**	**3**	**1**	**4**	**0**	**7**
Atchafalaya Bay		0	1	0	2	0	0
Bayou Black		1	2	1	0	0	0
Bayou Boeuf		0	0	0	0	0	2
Bayou DuLarge		0	0	0	1	0	0
Bayou Shaffer		0	0	0	0	0	0
Bayou Terrebonne		0	0	0	1	0	1
Berwick Bay		0	0	0	0	0	0
Gulf Intracoastal Waterway		0	0	0	0	0	4
Oyster Bayou		1	0	0	0	0	0
Gulf of Mexico	**2**	**2**	**3**	**1**	**2**	**0**	**0**

and the continuous usage of the two streams by watercraft throughout the historic period. Surprisingly, Bayou Plaquemine does not show a similar pattern, despite its known long and heavy usage by watercraft. Bayou Plaquemine shows a fairly large number of losses prior to 1850, all of which are steamboats, and just 2 losses after 1900. It may be that these numbers are showing the effects of clearing and snagging operations along the Bayou Plaquemine route after the 1850-period which made it much safer for boat travel.

Boat wrecks, all of which are steamboats, occurred on 8 different waterbodies within the Atchafalaya Basin during the interval 1825 to 1850 (see Table 4-5). This is the largest number of individually named waterbodies on which datable wrecks occurred for any of the time intervals used in Table 4-5. This is seen as somewhat reflective of the variety of navigation routes used in the basin by steamboats during this early time period. Over time, commercial vessels at least, began to travel on a more restricted number of routes, specifically those that were routinely maintained for navigation.

The data presented above provide information on the population of wrecks that exist in the study area and on the character of the documentary record which contains wreck information. Most obviously, it is apparent that a number of steamboat losses and accidents occurred in the study area for the period from 1830 to 1920. This mirrors the record from other western river areas (Pearson et al. 1989; Pearson and Wells 1999). In fact, in the study area, steamboats represent almost the only type of vessel whose loss was recorded in most of the study area for the

period prior to the Civil War. This, of course, is a reflection of the documentary evidence available on vessel losses and not a reflection of the actual losses that occurred. We know that large numbers of other types of boats, such as small folk craft, keelboats, flatboats, etc., operated on the waterways of the study area and many were certainly lost or abandoned. These exist as wrecks in the study area, but their existence will only be determined through physical examination. In fact, the few archeological surveys conducted in the region directed specifically at finding watercraft have demonstrated that these types of craft constitute the most abundant class of wrecks.

These same cultural resources surveys, also, have demonstrated that many boats find their way into the archeological record through abandonment, a type of loss which is very rarely found in the documentary record of boat losses. This phenomena has been reported for other areas and is certainly going to be common anywhere that boats were in common use for long periods of time. Additionally, it is also obvious that abandonment areas often are located near or at landings, boat yards, docks, etc., such that they can be identified, or at least their existence can be strongly suggested, through historical research.

The information on the distribution of reported losses shows that most of the wrecks occurred along the heavily traveled waterways. This is certainly true, but it does not reflect the large numbers of small commercial or non-commercial vessels lost and abandoned along smaller waterways in the study area. The studies along Bayou Shaffer, Bayou du Large and Bayou Grand Caillou, which have been discussed above, amply demonstrate this phenomena.

Assessment of Impacts to Boat Wrecks in the Study Area

The previous sections have presented information on the known and expected occurrence of wrecks within the study area. The evidence suggests that wrecks will be concentrated along historic navigation routes and at abandonment locales commonly situated near landings and docks. Within the study area, these types of locations incorporate a range of physical settings that exhibit varying environmental and cultural histories. As noted in previous sections of this report, a variety of natural and cultural (e.g., man-induced) processes will impact these locations and any boat wreck which they may contain. These processes can be quite variable in terms of both their temporal and spatial distribution, such that specificity in identifying the exact impact which any process or set of processes have had on any given wreck is difficult to achieve. The most reliable information on these impacts comes from the actual physical examination of wrecks in the study area. As noted, a small number of sunken vessels have been discovered and carefully examined in the area and they do provide details on the impacts of some natural processes and man-induced activities. But, these boats provide information on a fairly restricted range of settings and the results of their examination cannot be extended to all of the potential boat wreck settings extant in the study area. There is, however, some information from other wrecks in the region where natural and cultural processes similar to those found in the study area have occurred. Together, these two sources of information provide a starting point for assessing the impacts that various forces have had on the population of boat wrecks existing within the study area.

Natural Impacts

As discussed in a previous section, there are several types of natural processes occurring in the study area which might impact watercraft wrecks. The most important of these are: erosion, sedimentation, subsidence, and lateral channel migration. The impact of each of these processes varies in magnitude both temporally and spatially within the study area. Of these processes, sedimentation has probably had the most widespread effect in the Atchafalaya Basin, while erosion and subsidence have had the most serious impacts to wrecks located in the coastal segment of the study area. One area in the coastal zone where sedimentation rates have been high is in Atchafalaya Bay and the area immediately offshore from there (Seidel et al. 1998)

Sedimentation affects wrecks in several ways. The direct impact is to cover a wreck, which may both aid in its preservation and shield it from discovery. Sedimentation within navigable channels may, however, also encourage man-induced impacts through dredging. In the study area, sedimentation is most severe within the lower Atchafalaya Basin and, consequently, the COE has been engaged in considerable efforts to counteract its effects. Unfortunately, no information on the impacts of sedimentation or dredging to specific wrecks is available from the interior of the Atchafalaya Basin or from along the Atchafalaya River, where channel improvements have been extensive. However, the results of the remote-sensing survey and examina-

tion of boat wrecks along Bayou Shaffer by Pearson and Saltus (1991) conclusively demonstrates that sedimentation along tributary streams of the Atchafalaya can lead to wreck burial and preservation. That study found a number of watercraft, including a coal barge, a possible sloop or lugger, and several skiffs, buried along the banks of Bayou Shaffer. Some of the boats were both buried and submerged, while others, such as the coal barge, were only buried—the accreting stream bank having encapsulated the entire wreck. The examination of several of these boats indicated that they were in good condition, the wood generally well preserved and most of the boats were entirely or largely intact. The evidence suggested that all of these boats had been abandoned. Burial had aided in the preservation of these craft by placing them in a low-oxygen environment and by removing them from the potentially damaging effects of water currents, waves, etc. Many similar situations, particularly along the numerous smaller streams directly effected by the heavy sediment load coming from the Atchafalaya River, exist within the study area. Locations which exhibit high sedimentations rates, plus represent high probability locales in terms of vessel abandonment, will have a greater than normal chance of containing preserved sunken and/or buried boats.

Like sedimentation, subsidence is removing wrecks from view, and generally encourages preservation of wrecks. Subsidence is most prevalent along the coastal zone, particularly in the Terrebonne Marsh area. Subsidence may have a negative impact on wreck sites when it is associated with erosion. Along the coast it is difficult to determine whether erosion or subsidence have had the greater impact on wreck sites since both are occurring simultaneously. Unfortunately, we have no definitive data concerning the relationships between subsidence and boat wreck preservation in the study area. Data for prehistoric sites does exist, and shows that well-preserved cultural remains do exist at subsided sites throughout the deltaic region of Louisiana. We can assume that boats in the same setting will be similarly well preserved, however, the slow rate of subsidence means that few historic boats will have been buried to any great depth.

Along actively meandering streams, lateral channel movement is generally damaging to wrecks located along the cutbank, while it may act to preserve wrecks located along the point bar. Channel migration also encourages man-induced impacts in the form of bankline revetment. As noted, the Atchafalaya River, historically, has been the channel with the most severe lateral migration in the study area. However, this has been mitigated in the recent past by COE projects designed to lessen the movement of the Atchafalaya and to confine it's flow to a single channel. Migration has virtually ceased on slow moving channels in the study area, such as Bayou Teche, Bayou Black, and Bayou du Large and is minimal on many of the tidal channels in the coastal area.

No specific data on the impacts of lateral stream migration on wrecks are available from the study area. A few examples are available from the region which provide some clues as to what will happen to boats lost in an active channel in the study area. Recent research on the wrecks of the steamboat *Ed F. Dix* and the Federal ironclad gunboat USS *Eastport* on the Red River near Montgomery, Louisiana, has shown that large vessels can be well preserved, even when lost within the channel of an active and large river. The *Eastport* was scuttled across the main channel of the Red River in the spring of 1864 and the *Dix* struck and sank on top of the *Eastport* a year later (Birchett and Pearson 1996). Both boats were subjected to the full force of the flow of the Red for some undetermined period of time before the river shifted, ultimately covering the two wrecks with many feet of sediment from bank line accretion. Recent examination of the boats show that both maintain much, if not most, of the structural integrity of their hulls and that a variety of artifacts, including small objects, exist on and within the wrecks (Pearson and Birchett 1999). It is apparent that both boats have been quite well preserved, despite their loss in the main channel of a large river and their exposure to the full current of the river for some period of time.

A similar example can be found in the wreck of the Confederate gunboat *Arrow*, scuttled on the West Pearl River in the spring of 1862 (Pearson and Saltus 1996). This boat was burned and scuttled in the channel of the West Pearl and, apparently, became fairly quickly covered by sand. This rapid encapsulation preserved much of the hull of the boat and a large variety of artifacts resting inside the hull and on the deck. In fact, iron canister shot and solid shot for the *Arrow's* 32-pounder gun still rested on the bow of the boat when it was recently examined (Pearson and Saltus 1996). In the case of the *Arrow*, the apparent rapid burial of the boat preserved it for more than 130 years, even though it was in the main channel of the river. However, recent COE dredging activities have slightly altered the flow of the West Pearl and the boat is now being slowly uncovered and exposed to the

damaging effects of river current. The example of the *Arrow*, like the *Eastport* and the *Dix*, demonstrates that a large vessel sunk in a large and active stream can be preserved and, also, that dredging activities can have deleterious effects to buried wreck remains, even when those activities do not directly impact the wreck.

Cultural Impacts

As with natural impacts, those resulting from human activities in the study area may vary in magnitude across both time and space. The primary cultural, or man-induced, impacts on wrecks in the study area are: 1) channel snagging, 2) channel dredging, 3) revetment construction, 4) canal construction, 5) levee construction, 6) shell dredging, and 7) avocational diving. Of these, snagging, dredging, and canal construction probably have had the greatest direct impact on wrecks along navigable waterways of the study area.

Prior to 1900, virtually every attempt at navigation improvements along natural waterways in the study area included snagging and clearing operations. In many instances snagging was sufficient to maintain navigability and no additional navigation improvement was necessary. Although snags generally consisted of either logs or stumps, wrecks and log rafts were often included in this category. Wrecks deemed by the Corps to represent significant obstacles to navigation were often listed under a separate category and their removal was budgeted separately. It is assumed that those wrecks which were lumped with snags and obstructions represented small vessels or vessels sufficiently broken up such that their removal did not require a separate contract. In some cases, drifted logs would lodge against wrecks and, together, they would form obstructions in the channel. It is likely that in these circumstances the entire obstruction would be considered a single entity and everything would be removed together.

Wreck removals were funded or conducted by the Corps only as a means of improving navigation. The methods used in removing wrecks varied according to the condition of the wreck and the location of the wreck relative to obstruction of channel navigation. Wrecks were sometimes refloated, but many were broken up and the pieces hauled away for salvage. Some were simply blown to pieces with explosives so that nothing projected into the navigable portion of the channel. A description of wreck removal on Bayou Teche in 1870 provides some insight into the methodology used in the study area shortly after the Civil War:

> Some of the wrecks will be difficult of removal; but little besides the hull of each remains. All are visible at low water, most of them at high water. Nearly all are much decayed and partially broken up; the few that are comparatively sound can be shattered by several small charges of powder properly placed under them. All are but slightly imbedded in the mud. The bayou is narrow, and all the wrecks lie within from 10 to 75 feet of one bank or the other. The slope of the bed of the bayou and of the banks is favorable for dragging out these wrecks either entire or piecemeal.
>
> Shore tackle can be conveniently and economically used for loosening portions of each wreck, occasionally aided by a light derrick on a flat alongside the wreck. Oxen with drag ropes or chains can be used to haul the loosened pieces ashore and beyond the reach of floods. All of the wrecks of steamers are light built and light draught of the class employed on our western rivers. Several of them were slightly strengthened and used in the early part of the war as gunboats. As an example of the facility with which these wrecks may be removed, I cite the recent removal of the Rob Roy, which occurred shortly after the completion of the field work of this survey. I am informed by the engineer in charge of the work now being done by the State of Louisiana on the Teche, that this wreck was hauled ashore entire in three days, with only a steam capstan and drag ropes [CE 1870:348].

In some instances, a navigable channel could be obtained by removing only a portion of the vessel. As an example, for the removal of the wreck of the Confederate gunboat *Cotton* from Bayou Teche, the surveying engineer determined that "...an excellent channel can be made along the right bank and line of the deepest water by only removing that part of the wreck forward of the wheel shaft" (CE 1870:349). Large wrecks were commonly removed by demolition. The usual method was to blow the wreck into pieces which were then salvaged by boat or by winching them ashore. As mentioned previously, the removal of the *John M. Chambers* in 1885 was typical.

Dredging was a second major means for improving navigation. Prior to 1900, few natural waterways were dredged, except at the shallow bars where the channel emptied into the Gulf or another water body,

and dredging was conducted primarily to maintain water depths and widths which then existed. Along Bayou Teche, for example, the average depth of the channel below New Iberia was 6 ft during the 1880s. After dredging was completed in 1897, the average depth of the same section of the bayou was 5 ft (CE 1897:1764). Occasional dredging since that date has effectively widened the channel, but today the maximum depth is the same or even less than it was in 1870. For one sample cross section at Franklin, the present channel is about 9 ft deep while in 1870 it was 13 ft deep (Figure 4-3). The 1981 "theoretical design section" for this area is 10 ft deep. Thus, at this particular locale, some unknown portions of boat wrecks, such as the *Diana* which was located near the bank, may have been damaged or destroyed either through obstruction/wreck removal operations or through late nineteenth or early twentieth century dredging operations. On the other hand, any wrecks resting in the deepest part of the 1870 channel could have remained, at least, partially undisturbed and intact because the present channel is not as deep as the 1870 channel in that particular location and deep water wrecks were removed only if they were considered navigation hazards.

Impacts from dredging for any particular waterway are closely related to the difference between the modern maintained channel size and configuration and that of the channel at the time wrecks occurred. An examination of Table 4-6 reveals that the water depth has increased for maintained channel sizes for many of the water bodies of the study area which were navigable during the 1880s. However, this increase in depth does not necessarily mean that the entire lengths of all these channels were dredged. Quite the contrary, in many instances the increase in maintained channel depth is a reflection only of dredging of the channel mouths. Many inland sections of waterways were dredged minimally and some have never been dredged. During the 1930s, when an 8-by-80-ft channel was dredged between New Iberia and the mouth of Bayou Teche, the lower portion of the bayou already exceeded the projected channel dimensions. By 1936, the controlling depth (minimum depth) for the section between New Iberia and the mouth was 8.4 ft (CE 1936:698).

A third type of navigation improvement which could impact watercraft wrecks is revetment construction. As part of revetment construction, the existing stream bank is graded to a slope compatible with the type of revetment being constructed. This grading process removes a portion of the bankline both above and below the waterline. After grading is completed the new surface may be covered by either stone riprap or an articulated concrete mat. If wrecks are resting on or embedded in sediment being graded, these sites are impacted during construction. Both types of revetments extend to the thalweg of the river and could potentially cover wrecks, resulting in both their protection from erosion and their removal from further study. Revetment construction is not as common in the study area as elsewhere in the New Orleans District, such that it will have had a lesser impact to wrecks in general. No specific examples of the impacts of revetment construction for the immediate region are known, so the exact effects of this activity to sunken watercraft cannot be determined.

A fourth type of navigation improvement undertaken in the study area is canal construction. When canals are dredged within or across existing natural water bodies, such dredging activity may impact wrecks located along those waterways. The degree of impact will depend on the size of the canal, the size of the natural water body and the nature of the wreck involved. Canal construction has been extensive in parts of the study area. The GIWW represents the largest navigation canal in the area, extending across the entire southern section of the study area. Long portions of the GIWW follow natural channels which may have been deepened, widened or straightened to accommodate commercial traffic. Other portions of the GIWW represent completely artificial canals, dug through former fast lands or across shallow waterbodies. Other navigation canals, such as the Houma Navigation Canal, The Atchafalaya Ship Channel, plus numerous canals to provide access to oil and gas wells and associated facilities have been dug in the study area. Canal construction in the region began as early as the late eighteenth century and the Morgan Ship Channel across Atchafalaya Bay was one of the largest of these efforts undertaken in the nineteenth century.

The potential direct effects of canal construction are fairly obvious. A mechanical dredge could completely destroy a small vessel or seriously damage a large one. Additionally, canal construction often enhances erosion and alters water flow conditions, such that vessels which were formerly buried and partially preserved can be uncovered and, ultimately, exposed to a variety of deleterious conditions. No specific examples of the impacts of canal construction to wrecks have been found for the study area.

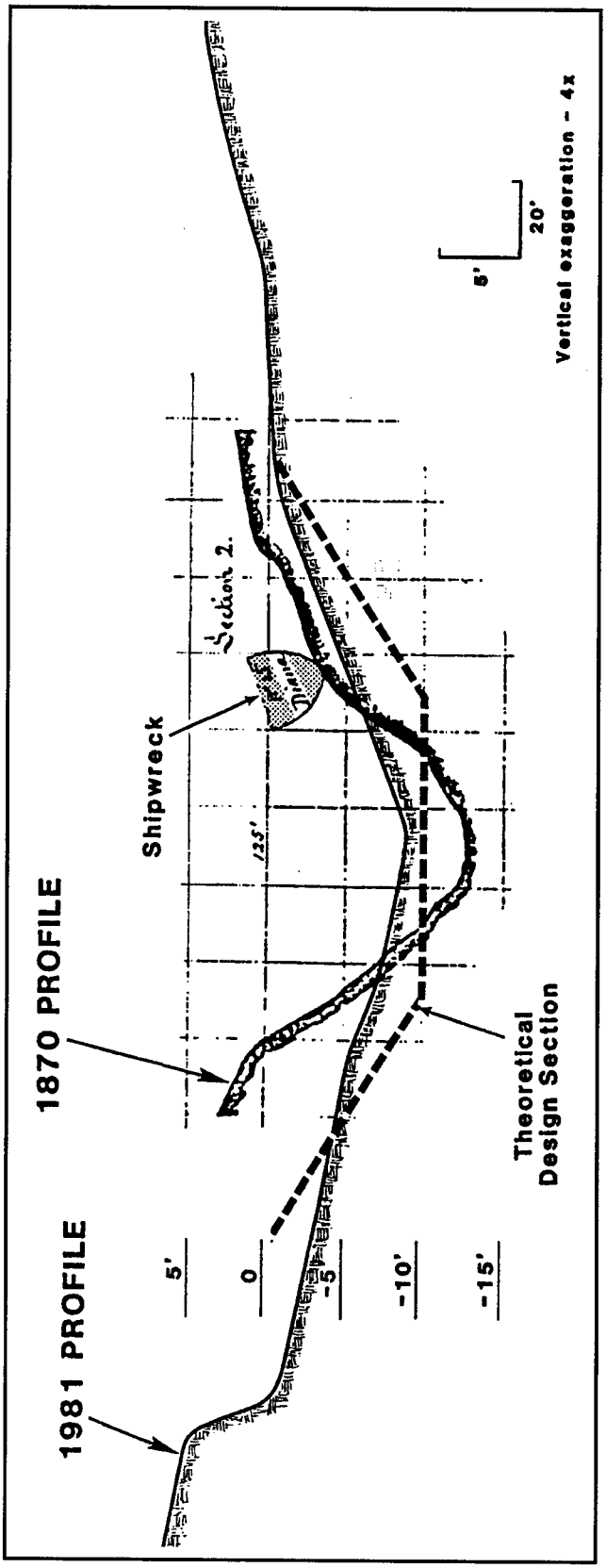


Figure 4-3. Overlay of 1870 and 1981 cross sections of Bayou Teche at Franklin Louisiana. The wreck of the gunboat *Diana* is shown in the 1870 section.

Table 4-6. Historic Dimensions of Selected Navigable Waterways in the Study Area (after: Pearson et al. 1989:Table 2-2).

Waterway	1880s		ca. 1936		1980s		Head of Navigation
	Length (mi)	Depth (ft)	Length (mi)	Depth (ft)	Length (mi)	Depth (ft)	
Atchafalaya River							
(a) Mouth	12.5	12		6*	15.75		20
(b) Above Morgan City							
Bayou Plaquemine	10.6	0	10.6	10	10.6	0	
Grand River							
Bayou Grosse Tete	30a	10b	7	8	29	5	mi. 29
			22	5			Maringouin
Bayou Black	24	6					
Bayou Des Glaises/Bayou Rouge	63.75	1					
Big Bayou Pigeon				6.4 (5*)			
Little Bayou Pigeon				5*			
Grand Lake		3.5					
Bay Natchez				8			
Bayou Teche	0-45	6	0-54	8*	0-54.5	8	
Bayou Cortableau		1					
Bayou Fusilier						2.8 ?	
Freshwater Bayou/Belle Isle Canal						19.85	12
Houma Navigation Canal					36.5	15	

a 1904
b 1897
* Depths at mouth or controlling depth.

Another cultural impact which applies to coastal sections of the study area is shell dredging. Today, commercial shell dredging occurs in several coastal bays of the study area (U.S. Army Corps of Engineers 1987a, 1987b). During the late-nineteenth and early-twentieth centuries shell dredging was synonymous with destruction of prehistoric shell mounds and middens. Such activity took place to varying degrees in every coastal parish of Louisiana. Two of many specific examples include the removal of the large alligator effigy mound along Grand Lake in Cameron Parish for road fill (McIntire 1958:57-58) and dredging of shell mounds in the Atchafalaya Basin as construction material for the Keystone Lock along Bayou Teche (CE 1883:1115). These early dredging operations were most likely to impact watercraft wrecks if the wreck sites were located along bank lines. Below-water dredging is a twentieth-century phenomenon. Commercial offshore dredging effectively began with the issue of a dredging lease at Point Au Fer Reef in 1914. Prior to World War II, major leases were issued in many areas, including Atchafalaya Bay (U.S. Army Corps of Engineers 1987b). Clam shell dredges use a movable cutterhead and suction pump to remove shells from the bottom. Shell dredging impacts potential watercraft sites because it includes the removal of sediment in the area being dredged. Wrecks of small vessels or fragmentary remains of larger vessels might be completely destroyed. Larger wrecks might be partially destroyed both by the dredge and by exposure if the sediment surrounding the wreck is removed during the dredging operation. Very large, intact wrecks might be minimally impacted because shell dredges would move on rather than foul their equipment.

A fifth navigation improvement which may impact watercraft wrecks is levee construction. During levee construction wrecks are most likely to be encountered through excavation of borrow pits, particularly if borrow pits are located along the batture of a waterway where active deposition has occurred or in former channel locations which have since been filled. Impacts on wreck sites may also occur during grading or leveling operations done prior to construction of levees.

A final cultural impact is avocational diving, which includes treasure hunting and relic hunting. These activities commonly occur entirely unreported to agencies with official jurisdiction over historic wrecks (i.e., U.S. Army Corps of Engineers, State Archaeologist's Office). Few reports of avocational exploration of wreck sites in the study area are known.

It is difficult to determine the widespread impact of various cultural activities on wreck sites in the study area without an accurate assessment of the numbers of wrecks, types of wrecks, and locations of wrecks relative to construction and other cultural activities. Detailed surveys for historic wrecks have been conducted on small portions of only a handful of waterways in the area. Examination of a portion of the lower Teche was inclusive as to the existence of submerged watercraft (Goodwin et al. 1991), while the survey of Bayou Shaffer revealed numerous, well-preserved wrecks (Pearson and Saltus 1991). Studies in other areas, such as along several rivers on the north shore of Lake Pontchartrain, have recorded numerous intact boat remains which predate extensive snagging and clearing activities undertaken along the waterways. In these instances, it is obvious that the navigation improvements have had little impact on these sites (Saltus 1985, 1986). The available evidence indicates that it is not possible to assume that all wrecks have been destroyed if a channel has been dredged or snagged. Even if wrecks are reported to have been removed, the historical documents usually provide little information which would aid in the determination of the type or condition of the wreck either before or after removal. For the vast majority of historically recorded wrecks, no specific information is available on vessel type, size, condition, cargo, method of removal, types of remains, or the integrity of the remains. Some assessment of wreck condition can be postulated through a consideration of post-depositional impacts, as is done in the present study. Detailed evaluation of the integrity of shipwreck remains will require physical examination.

Evaluation of Significance of Boat Wrecks in the Study Area

Determination of significance is an important aspect of COE cultural resource investigations and management planning. In Federally funded, sanctioned, or permitted projects, the established standard for determining site significance is the evaluation of a property relative to its eligibility for nomination to the National Register of Historic Places. In the present instance, the sites of primary concern are those defined as "shipwrecks" by the National Park Service. A shipwreck is defined as:

> A submerged or buried vessel that has floundered, stranded, or wrecked. This includes vessels that exist as intact or scattered components on or in the sea bed, lake bed, river bed, mud flats, beaches, or other shorelines, excepting hulks [National Park Service 1985:2-3].

National Register Bulletin 20 provides the procedures for assessing significance specifically for watercraft and boat wrecks. This *Bulletin* notes that a vessel's significance is based on its representation of vessel type and its association with significant themes in American history and a comparison with similar vessels. Specifically, to meet the requirements for eligibility to the National Register a vessel must:

> . . .be significant in American history, architecture, archaeology, engineering, or culture, and possess integrity of location, design, setting, materials, workmanship, feeling, and associations. To be considered significant the vessel must meet one or more of the four National Register criteria:
>
> A. are associated with events that have made a significant contribution to the patterns of our history; or
>
> B. are associated with the lives of persons significant in our past; or
>
> C. embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. have yielded, or may be likely to yield, information important in prehistory [National Park Service 1985:5-6].

In the case of shipwrecks, as opposed to intact vessels, significance requires that the wreck display sufficient integrity to address architectural, technological, and other research concerns.

As noted, significance requires that a vessel be representative of its type, a factor influenced by the number of other vessels of the same type which have been studied or which are available for study. This requires knowledge of the archeological data base of shipwrecks. Within the study area, a small number of boat wrecks and remains have been discovered, primarily as a result of cultural resources management studies, but of these, very few have been identified and fewer still have been studied in any detail. While there are large numbers of wrecks reported in the study area, most are historically documented events, only a handful are confirmed archeological properties. Thus, today, almost any historic vessel found in the waters of the study area that displays sufficient integrity to provide information on its manner of construction and place or date of build, and which can provide unique information on its type, has a fairly high chance of being determined significant.

Assessment of site significance for any individual wreck can be most adequately accomplished through a consideration of several key issues. Particularly important is a consideration of the wreck within the structure of a historic context. As discussed previously, three broad historic contexts, defined chronologically, have been addressed in this study. The information presented on the study area's navigation and settlement history has been structured by these historic contexts. The significance of any archeological boat wreck discovered in the study area can be more adequately accomplished if it is evaluated within one of these historic contexts. Watts (1985) in a discussion of Civil War shipwrecks, has provided details on how assessments of significance can best be carried out within the framework of historic contexts. His ideas, although made 15 years ago, are still applicable to the study area today. He notes:

> First, assessment of vessel significance must be made within a well developed historical context. That political, social, military, economic and technological context is essential to understanding the nature of human activity associated with the remains of any ship. Although sufficient data exist to develop an excellent historical context to support assessments of shipwreck significance and identification of research priorities, little effort has been made in that direction.
>
> Second, assessment of shipwreck significance and identification of research priorities should be made with specific consideration for the nature and extent of the associated resource base. While it is perhaps possible to identify those shipwrecks which are of paramount importance without a detailed examination of the associated resource base, it would be difficult to responsi-

> bly assess the significance of other shipwreck sites where values must be determined in accordance with representative criteria. Until the shipwreck population of a given period can be quantified and categorized, it is virtually impossible to make judgments concerning significance and/or priorities for research. This research and an assessment of the resource base are particularly critical to the development of responsible priorities that realistically reflect resource values.
>
> Third, shipwreck significance must be established with specific consideration for the nature and scope of the archaeological record both at the site in question and with respect to other resources in that respective category. Where wrecks are considered as representative of a particular category, the condition of the site and integrity of the archaeological record must be evaluated in determining significance and research potential [Watts 1985:136].

Among Watts' most emphatic points is the need to gain some realistic representation of the shipwreck population of a given area, if reliable assessments of significance are to be made. This has been a primary goal of the present study. However, as mentioned many times, while there is a considerable amount of documentary information on vessel losses it is often incomplete and unreliable. On the other hand, archeological data on wrecks, although generally more reliable than historical documents, are rare for the study area. As a result, until more specific data on wrecks within the study are collected, assessments of significance must rely heavily on data derived directly from historic contexts.

Assignment of "Level of significance" is an important aspect in the significance determination. Level of significance refers to the "geographical area—local, state, or national—for which a property has been found to have importance" (National Park Service 1982:13). The level of significance is based on the historical value which can be assigned to a property (i.e. shipwreck) "given the current scholarly research about the property's historical role or impact, its representation of a historical theme, or its information potential" (National Park Service 1982:13). The level of significance of archeological sites, including shipwrecks, which are significant because of their information potential, is dependent on the nature and scope of the applicable research design. For example, in some instances, a wreck may yield information on research questions which are broad in scope and, thus, may be considered significant at the state level. In other instances, depending upon the orientation of the research, the wreck may address only very local questions.

"Local" refers to a geographical entity within a state such as a town or county. A shipwreck would be of local significance if it aides in the understanding of the history of the local area by "illuminating the impacts of the associated events or persons," serves as a representative of a local style, or exhibits information potential bearing on themes of local interest (National Park Service 1982:13). Determining that a wreck is locally significant requires a knowledge of other properties associated with the same "local historical theme or themes." These other properties may be extant properties (e.g., other shipwrecks) as well as those that previously existed.

A shipwreck with state significance is one which aids in understanding "the history of the state as a whole by illuminating the statewide impact of events or persons associated with the property, or its architectural type or style, or information potential. State significance may also apply to a property that illustrates a theme that is important to the history of the state" (National Park Service 1982:14). A shipwreck could be assigned a state level of significance if it were associated with events or persons or represented a style whose impact or influence extended beyond the local level.

A shipwreck would be assigned a national level of significance if it helps "understand the history of the nation by illustrating the nationwide impact of events or persons associated" with it, represents a style or reflects construction techniques deemed of national importance or provides information on themes of national importance. Nationally significant shipwrecks would be those which could document major trends in American history or which had a "profound" impact on the direction of research goals of shipwreck archeology. Generally, these shipwrecks would exhibit an excellent state of preservation, since this would increase the scope of their information potential (National Park Service 1982:15).

Assignment of any of these levels of significance requires a knowledge of other "properties" associated with that particular level of significance. As noted above, because verified shipwrecks are so few in number in the study area, these other "properties"

are, of necessity, often derived from the historical record.

The historical record for vessel use, numbers, types, etc. provided in this study establishes the framework needed to, at least, begin the evaluation of significance of the potential shipwreck resource base within the study area. In doing this the evaluation relies on the four criteria of eligibility presented above. The data at hand allow for the evaluation of significance at primarily the vessel type or category level. Various classes or types of vessels which may exist as wrecks in the study area and which have the potential for significance are discussed below by the time intervals incorporated in the historic contexts. An assumption has to be made that the vessels discussed express sufficient physical integrity as a wreck site to permit the extraction of useful information. The probable level of significance to which vessel or a class of vessels may appropriately be assigned are given as examples.

Significance Within Historic Contexts

The Early Years of Navigation, 1718-1812

All vessels dating to this time period should be considered significant. Of particular importance are flatboats, keelboats, and other inland watercraft which were developed and came into prominence during this period. No specimens of these types have been found in the study area during this period. The significance of sloops, galleys, and other larger classes of vessels is not as great since some historical information is available on these types from their use in Europe during this period. The only known archeological example from this period in the region is the Spanish merchantman *El Nuevo Constante* which sank in 1766 (Pearson and Hoffman 1995). This vessel has been determined to be significant and eligible for inclusion in the National Register of Historic Places. Most vessels dating to this period would be significant at the state or national level.

The Era of Steam, 1812-1936

Many vessel types dating to this time period should be considered significant. Vessels of particular importance include early examples of steamboats, which were introduced into the study area in the 1820s. No known examples of watercraft from this period have been examined archeologically. Shipwrecks in this class would certainly be nationally significant if they date to the pre-1820 period. This is the period when keelboat use was at its peak on the inland waters of the area and small sailing vessels were coming into use on the coastal waters of the study area. These types of vessels, especially those built in the region, are considered significant at the local and/or state level. Of lesser significance in this time period would be steamboats and barges constructed and used during the latter portion of the period.

An increasing amount of historical and architectural information on vessels argues for a decreased significance for many classes of vessels from the later part of this time period. Steamboats associated with significant events or individuals, or are considered representative types in terms of architecture or technology should be considered significant. Early examples of steam towboats should probably be considered significant. Many classes of small "folk craft," such as sloops, skiffs, or schooners, should be considered significant if they are reflective of regional styles. The small boats recorded along Bayou Shaffer by Pearson and Saltus (1991) are representative of this class of boats. Early examples of gasoline-powered vessels may be considered significant; however, this would have to be weighed carefully against available documentation for any particular vessel.

The Civil War, 1861-1865

The majority of reported vessels from this period were sunk as a direct result of the Civil War. No known examples of vessels from this period have been archeologically examined within the study area. The fact that most of these vessels were associated with events "that have made a significant contribution to the broad patterns of our history," one of the criteria for National Register eligibility, establishes their significance. Most of these vessels would be significant at the state level and some would have to be considered nationally significant.

Navigation in the Modern Era, Post 1936

Vessels post-dating 1936 will generally not be considered significant unless they are associated with a significant event or person or embody the distinctive characteristics of a type, period, or method of construction.

A final consideration which has not been adequately addressed is the importance of vessel cargo

in determining site significance. Even if several wrecks of a particular vessel type have been sufficiently examined and the significance of that vessel type has been lessened, the vessel cargo alone may be very significant. As an example, the excellently preserved artifacts from the wreck of the *El Nuevo Constante* (a "salvaged" wreck) were probably of greater historical, archeological, and anthropological significance than the physical remains of the vessel itself (Pearson and Hoffman 1995).

CHAPTER 5

SUMMARY AND CONCLUSIONS

Shipwreck Potential of the Study Area

One of the principal objectives of this study is to establish the potential that various waterways within the study area have for containing shipwrecks. As stated in the Scope of Work, this is to be achieved through the "identification of high, medium and low probability zones for shipwrecks for the various waterways of the study area." The potential that any waterbody in the study area has for containing shipwreck remains is related both to its history of vessel use and loss and to the impacts which natural and cultural forces have had on any wrecks that may have occurred. The previous discussions on the geology and history of watercraft use in the region and on the presently known occurrence and distribution of shipwrecks provides a beginning point for assessing the shipwreck potential of many of the waterways in the study area.

The data presented here demonstrate clearly that a number of navigable water bodies within the study area have a historically documented potential for containing wrecks of varying ages and types. This information is useful for obtaining a first-order measure of the shipwreck population along the waterways of the study area, but it cannot be considered alone. As has been emphasized previously, the sample of shipwrecks presented in this study is largely an historical construct derived from recorded vessel sinkings. These data must be weighed against an array of other considerations if reasonable estimates of the existence of boat wrecks as archeological sites are to be obtained. These considerations include the nature of the wreck event, the condition of the waterway at the time the wreck occurred, the natural dynamics at the wreck site and their impact on the wreck over time, the nature of human impacts on the wreck site (navigation improvements, etc.), and other factors. For any given boat wreck, information on some of these variables may be available in very general form, but for most historically recorded wrecks these classes of information are either entirely non-existent or are extremely vague and imprecise. Because of this, all of the statements on wreck probabilities presented here, while reasonable in light of the available data, must be viewed as tentative.

It, also, needs to be emphasized that the ultimate objects of concern in this study are watercraft which exist as archeological sites in the study area. The significance (in regard to National Register criteria) of any extant boat wreck will, in the final analysis, be a critical concern to cultural resources managers, but Federal guidelines for evaluating cultural resources require that the resources first be inventoried and identified, and then be assessed for significance. The previous chapter has presented some general ideas about the potential significance of archeological boat wrecks in the study area which posit that many classes of watercraft remains will be significant as long as they exhibit the required physical integrity. The present discussions, then, consider wreck potential of waterways in the general sense

of occurrence of any boat wreck, regardless of whether or not that wreck will eventually be deemed significant.

The following discussions on probability have been modeled on those presented in the study by Pearson et al. (1989). In that analysis, the authors used two measures to discuss wreck potential; probability and sensitivity. The concept of sensitivity referred to the likelihood that a known or suspected wreck site may be adversely impacted by natural and cultural processes. It, specifically, was derived from the presumed contextual integrity of a shipwreck site (based primarily on assumptions about post-depositional impacts) and on the potential that the site would be impacted by ongoing or future Corps of Engineer projects. In the present study, the concept of sensitivity is not utilized. Rather, assessments of wreck potential along waterways rely on the concept of probability.

Probability refers to the potential that an individual waterway has for containing shipwrecks. Assessments of probability for waterways in the study area rely on several criteria. The most important of these are: (1) the known intensity of vessel use of a waterway as reflected in the historical record, (2) the quantity of known boat wrecks in a waterway as determined from the historical and archeological record, and (3) the known impacts which natural and human actions have had on known shipwrecks along individual waterways.

For most waterways in the study area, assessments of probability of wreck occurrence have relied heavily on the available record of vessel losses in an effort to make the determination as explicit as possible. It is recognized, however, that the nature of the available data ultimately dictates that some degree of subjectivity enters the assessment. Most important is the fact that biases exist in the available data on historic use and recorded losses along waterways which must be considered if the probability assessments are to be used as management tools. These biases have been noted in early sections and are briefly addressed below. The third criterion used in assessing probability, that is, natural and human impacts, is one for which minimal information is available for the study area as a whole. Essentially, this criterion is factored into the probability rankings of streams on the basis of assumptions about impacts as derived from several sources, most importantly the geological setting and history of waterways and their past history of navigation improvements. A discussion of these probability rankings is presented later. Here, as mentioned above, it is important to address some of the biases which exist in the data used to develop the assessments of probability.

Of particular concern is the relationship between an historically documented shipwreck and its current existence as an archeological entity. As Pearson et al. (1989) note, going from one to the other requires a consideration of post-depositional impacts to the wreck. These impacts have been reviewed in Chapters 2 and 4. Admittedly, these factors are difficult to assess areally and there are little field data available to allow evaluation of their impacts on specific wreck sites in the study area. The conventional view concerning these impacts seems to emphasize the damage or disturbance they will cause to a wreck site. However, the small amount of actual field data on wreck sites available in the study area suggests good preservation of sunken vessel remains in a variety of natural and cultural settings (e.g., Goodwin and Selby 1984; Pearson and Saltus 1991; Stout 1992). There are obviously many imponderables involved in postulating these impacts and, while they have been generalized in this study, additional field data from shipwreck locales is required to refine our knowledge of their effects.

An additional bias inherent in the data concerns the nature of the historical record of losses and the actual presence of wrecks in an area. Assessment of this type of bias requires areal field surveys for shipwrecks. To date, there are only a few locations in the study area for which we have even partial archeological data concerning wreck potentials. These include Bayous Shaffer and du Large, the lower part of Bayou Teche, parts of the lower Atchafalaya River just above and below Morgan City and some of the waterways in the Bayou Chene area. Two of these studies, those along Bayous du Large and Shaffer, located a number of abandoned watercraft, some of which represent significant cultural resources. Although it is unclear whether the findings from these studies are representative of the study area as a whole, many similar settings exist in the study area and it is presumed that they will exhibit similar situations in terms of types, numbers, and condition of watercraft remains.

As Pearson et al. (1989) emphasize, it is apparent that the historical record of vessel loss may be at considerable variance with the archeological shipwreck record for specific waterways. This is cer-

tainly true in the study area. However, until archeological data are obtained, the historic record provides the best available source for characterizing the potential shipwreck population in most of the waterways of the study area.

Assessment of Shipwreck Potential by Waterway

The historical information presented in foregoing chapters of this study has demonstrated that there is a potential for finding historic boats on most of the waterways of the study area. This is particularly true for the period after about 1770, when European settlement of the region began to intensify. It is known, however, that particular water routes came into common use because they provided the most convenient passage between towns, communities and plantations. Additionally, it is also known that some of these routes fell into disuse as patterns of settlement and commerce changed or, particularly in the lower Atchafalaya Basin, as natural processes rendered routes nonnavigable. This type of information, plus specific information on known vessel losses and the known or assumed impacts to shipwrecks from human and natural forces, have been used to develop the high, moderate and low probability rankings shown in Table 5-1. The waterways listed in Table 5-1 include those that are currently classified as navigable by the COE, as well as those mentioned in historic records as routes of navigation or where wrecks occurred. Figure 5-1 presents a map delineating those portions of waterways in the study area which are deemed to have the highest probabilities of wreck occurrences along them.

As noted, the probability rankings rely on the combination of information derived from the foregoing discussions on the history of vessel use and losses along specific waterway and on their history of cultural and natural impacts. For example, the main channel of the Atchafalaya River above Morgan City has been given a high probability rank during most of the historic period because of its known intensive use by watercraft and because of the quantity of known shipwrecks occurring along it. Specifically, it is known that the Atchafalaya served as a principal route for steamers during much of the nineteenth century. It is true that steamboat activity decreased along the river well before 1936, but the time periods used in Table 5-1 are reflective of the intervals developed for the historic contexts discussed earlier. It is also recognized that boat traffic along the Atchafalaya River has been intensive since 1936, but since that time navigation improvements and advances in vessel technology have resulted in a decrease in vessel losses. While natural forces, such as erosion and scour, and human activities, such as dredging, have certainly impacted boat wrecks along the Atchafalaya, the nature of the impacts remain primarily unknown entities. It is argued here, however, that even in the Atchafalaya River, these impacts are likely to have been less damaging to wreck populations than commonly postulated. As discussed earlier in this report, recent studies have demonstrated this to be true on other, similar waterways. Until reliable data on these impacts are available for the Atchafalaya River, the wreck probability ranking will remain fairly high, as suggested by other criteria.

It is recognized that specific locales or segments along individual waterways will express variability in shipwreck occurrences. Overall, however, the limited nature of the data on specific distributions of shipwrecks along navigable portions of waterways makes this difficult to quantify. In general, it can be said that shipwreck probabilities along waterways will be higher in the vicinity of ports and docking facilities and in areas where natural settings produced conditions contributing to vessel losses. For example, those portions of the Atchafalaya River, Berwick Bay and Bayou Boeuf near Morgan City may be considered to have a high probability for wreck occurrence throughout the entire historic period. Not only has there been a considerable amount of boat activity in and around Morgan City, but large numbers of worn out and decrepit boats are likely to have been abandoned near the town. There are a number of convenient abandonment locales along the Atchafalaya River just above Morgan City and along Berwick Bay below the town. In fact, today there are a number of abandoned vessels along the west bank of the Atchafalaya just above Morgan City, but specifics on the type and age of these boats are not available.

Figure 5-1 shows those waterways within the study area that are deemed to have the highest probability for containing historic wrecks. This figure needs to be considered in conjunction with the information presented in Table 5-1. As shown in Figure 5-1 and in Table 5-1, all of that portion of Bayou Teche falling within the study area is considered to have a high probability in terms of wreck potential. This is in spite of the fact that this waterway has had a long history of navigation improvements. It is known that numerous vessels have been lost along this portion of Bayou Teche, and we currently lack specific information as to how successful past improvement activities have been in removing individual

Table 5-1. Probability of Shipwreck Occurrence by Waterway and by Temporal Periods.

Waterway	1718 to 1812	1812 to 1861	1861-1865	1865-1936	Post 1936
Atchafalaya Basin					
Atchafalaya River (above Morgan City)	HM	H	H	H	M
Bayou Des Glaises	M	M	M	M	M
Bayou Grosse Tete	M	M	M	M	M
Bayou Pierre	L	L	L	L	M
Little Bayou Pigeon	M	M	M	L	L
Big Bayou Pigeon	H	H	H	M	L
Bayou Plaquemine	H	H	H	H	L
Bayou Sorrel	H	H	H	H	L
Bayou Teche	H	H	H	H	H
Bayou Courtableau	L	M	M	M	M
Bayou Fordoche	L	M	L	L	L
Belle River	L	L	M	M	M
Flat Lake	M	M	M	M	M
Grand Lake	M	M	M	M	M
Grand River	M	M	M	M	M
Upper Grand River	H	H	H	H	M
Lake Chicot	M	M	M	M	M
Lake (Bay) Natchez	M	M	M	M	M
Lake Palourde	L	L	L	L	L
Lake Verret	L	L	L	L	L
Six Mile Lake	M	M	M	M	L
Wax Lake Outlet	L	L	L	L	L
Minor Waterways in the Atchafalaya Basin	L	L	L	L	L
Coastal Area					
Atchafalaya Bay	L	M	M	M	L
East Cote Blanche Bay	L	M	M	M	L
West Cote Blanch Bay	L	M	M	M	L
Vermilion Bay	L	M	M	M	L
Bayou Black	H	H	H	H	M
Bayou Boeuf	H	H	H	H	M
Bayou DuLarge	L	L	L	M	M
Bayou Shaffer	L	L	M	M	L
Bayou Terrebonne	M	M	M	M	M
Berwick Bay	M	H	H	H	M
Minor Waterways in the Terrebonne Marsh	L	L	L	M	M
Gulf Intracoastal Waterway	N/A	N/A	N/A	L	L
Houma Navigation Canal	N/A	N/A	N/A	N/A	L
Gulf of Mexico					
Isles Dernieres Area	L	M	M	M	L
Wine Island/Cat Island Pass Area	L	M	M	M	L
Gulf of Mexico (To 3-mile limit)	M	M	M	M	L

H=High; M=Medium; L=Low

wrecks. As Pearson et al. (1989) have noted, numerous partial as well as intact boats have been found submerged in waterways where snagging and clearing activities have been conducted. There is no doubt that some vessels, or portions of some vessels, have been removed from Bayou Teche; this is detailed in COE records. But many small boats, or portions of removed boats, or boats resting close to the banks or at deep depths in the bayou may never have been removed. From a cultural resources perspective, even

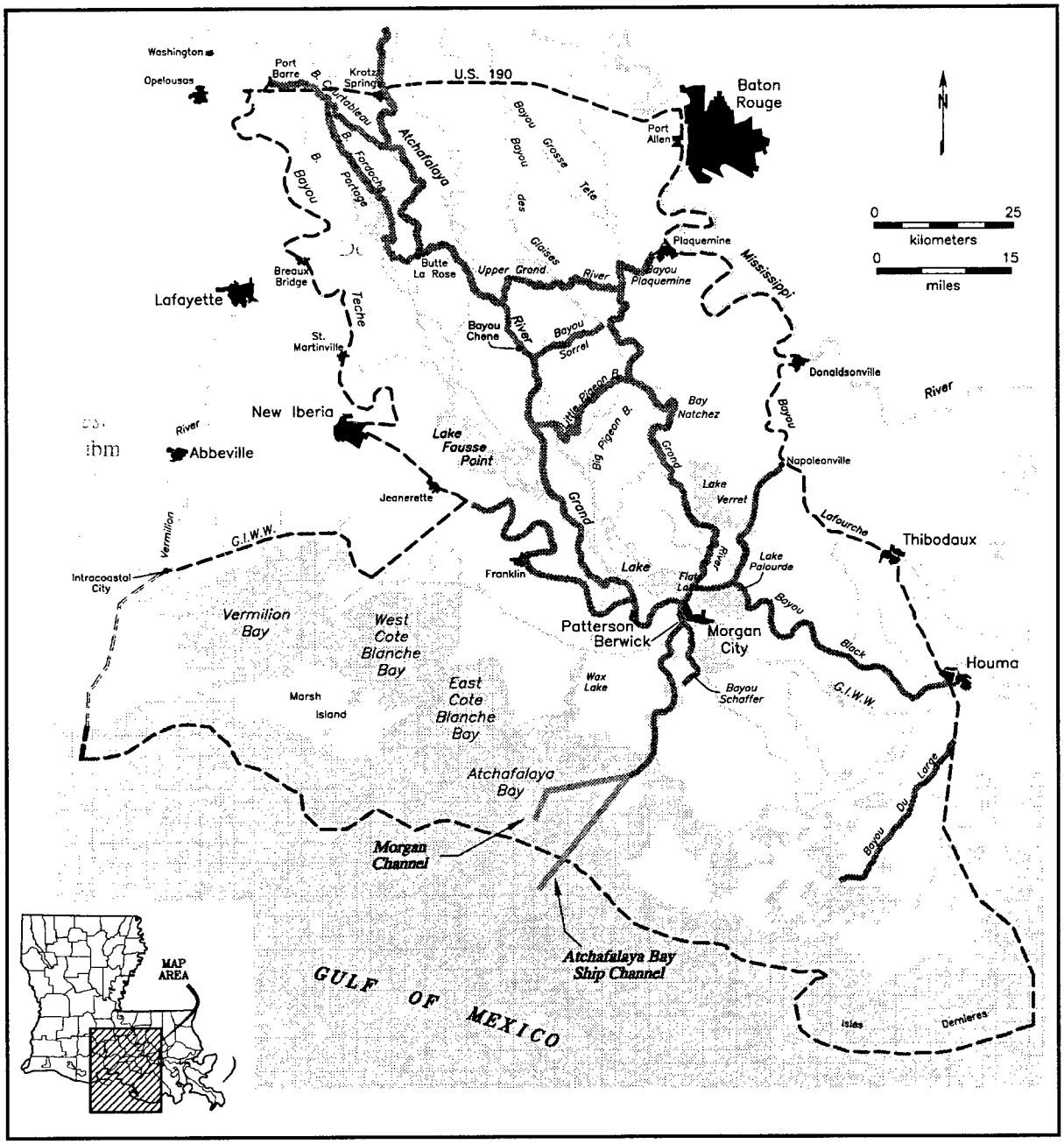


Figure 5-1. Map of study area showing water routes with high probabilities of containing shipwrecks.

a portion of a Civil War gunboat (e.g., the *Cotton*), or an 1850s steamboat is likely to represent a significant cultural resource.

The other waterways shown on Figure 5-1 include those that have had long histories of navigation, or have had intensive periods of navigation, and along which historical records show losses have occurred. As more data on actual wreck occurrences along waterways are collected, assessing the wreck potential of specific segments of individual waterways may become possible.

Research Objectives of the Present Study

While the boat wreck population developed here requires verification, within the historical contexts presented earlier, it provides a data set about which

research questions of an archeological and historical nature can be asked and from which research objectives and hypotheses can be drawn. Relying on the framework provided by the historic contexts, five specific research objectives were presented in Chapter 1. These are:

1. What is the nature of the archeological record of shipwrecks relative to the historic record of vessel use and loss in the study area?

2. To what extent and in what ways did the development of waterborne transportation influence settlement in the area?

3. How do the kinds of cargoes carried by watercraft reflect local and regional economies?

4. How have vessel types and their utilization changed over time within the region, and what factors influenced variations in vessel types and patterns of use?

5. How do the specific environmental and cultural attributes of the region affect the local tradition of boat use and construction?

Data that successfully addresses the first of these questions were collected in this study. The results, as have been discussed previously, are that there is minimal correlation between the archeological record, the historical vessel use record and the historical vessel loss record. The reasons for this are multiple. The most obvious factors are related to the nature of the historical records of vessel losses, particularly the restricted types of vessels that tend to be recorded, and to the small archeological record currently available.

The second and third objectives have been approached only in a general sense and are fully discussed in the historical sections of this report. Historical data that does permit partial examination of research objective four were collected. The details of the changes in vessel types are presented in the historical discussions. As expected, it is apparent that a whole range of environmental, cultural, and economic factors have influenced these changes. For example, the shallowness and narrowness of many waterways have dictated the use of small vessels, often constructed specifically for those types of waterways.

Historical data, also, were collected that bear on research objective 5 and a number of specific examples have been provided which demonstrate the influence that environmental and cultural attributes have had on the tradition of boat use and construction. Of particular interest is the fact that the French tradition of building flat-bottomed, keel-less vessels is the dominant characteristic of the smaller folk craft of the region. Additionally, flat-bottomed boats were adapted to, and influenced by, the shallow and sluggish water conditions commonly found within the study area.

Recommendations for Future Research and Management

The following section presents a series of research objectives that are considered appropriate to the study of historic boat wrecks within the study area. It is important to emphasize that these are only a few of the research questions pertinent to wrecks in the area. These are some that are believed to be important in understanding the history of vessel use in the region and which can be addressed with the potential population of wrecks in the study area. Over time, these research questions may be altered and others, considered more pertinent, will be added. Additionally, it is believed that the types of research objectives presented here will mesh with the management concerns of the Corps of Engineers and can be incorporated into the types of projects undertaken by the COE within the study area.

An array of research interests are now prevalent in shipwreck archeology. Commonly there is an effort to consider the shipwreck, in part, as a miniature "cultural system," composed of a number of elements, each worthy of examination but all considered interrelated. These elements, or areas of interest, usually include vessel construction, cargo, ship stores, and armament (Pearson and Hoffman 1995). Other avenues of research encompass the study of specific, historically important vessels or the study of classes of vessels. For example, in southern Louisiana, and in the study area specifically, there is a long-standing interest in the study of locally made and used folk craft. Research on these vernacular craft has addressed questions about the form and function of boats, the ethnic and cultural milieu in which boats were made and used and the history and organization of boat-building traditions in the area.

These, and other areas of interest, have been considered in the development of the research goals presented here. They are considered, however, in terms which are most applicable to the study area.

Of concern in the implementation of research in the study area is the interrelationship of research with management goals and considerations. Pertinent to this are considerations of the relative significance of shipwrecks (discussed earlier) and justifiable areas of archeological interest. These latter are defined in 36 CFR 229, the *Archaeological Resources Protection Act of 1979*. In that regulation, an archeological resource is identified as "any material remains of human life which are at least 100 years of age and which are of archaeological interest." "Of archaeological interest" is defined as:

> capable of providing scientific or humanistic understandings of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques such as controlled observation, contextual measurement, controlled collection, analysis, interpretation, and explanation.
>
> A variety of material remains are considered of interest, including:
>
> All portions of shipwrecks (including, but not limited to, armaments, apparel, tackle, cargo)

In light of this regulation, it is apparent that shipwrecks expressing integrity which are over 100 years old are most certainly going to be of archeological interest. It must be emphasized that these regulations cannot be used to eliminate vessels that are less than 100 years old from evaluations of significance. Many wrecks less than 100 years old will meet the criteria for significance for inclusion in the National Register. This is evident by the current inclusion in the Register of several floating craft and wreck sites of vessels less than 100 years old.

In light of the above discussion, a series of specific research topics pertinent to the study area and organized by major temporal periods, defined in the previously discussed historic contexts, are provided below.

The Early Years of Navigation, 1718-1812

1. What is the form and construction technology of the early Euro-American vessels (e.g., keelboats and flatboats) in the study area?
2. How do these forms change over time?
3. What, if any, are the differences in the types of boats used during the major governmental regimes (French, Spanish, American) of Louisiana?
4. What are the changes in waterborne commercial activity during these major regimes?
5. What evidence is there for development of local and regional vessel types and construction techniques as expressed in the archeological shipwreck record?
6. What are the processes of wreck site formation and under what conditions will archeological wreck sites be preserved?

Research questions concerning very early European watercraft are applicable to a fairly large portion of the study area. This is particularly true for small boats, such as pirogues and skiffs, which plied many of the waterways of the region. Some of the larger boats, such as keelboats and classic flatboats, were probably used on a restricted number of water routes and it is along these that most of these types of vessels were lost. However, preservation of these boats and other types of boats is likely to be optimal in small distributaries or tributaries streams where they may have been abandoned. Research topic 6 listed above is meant to address the question of wreck preservation through an examination of the processes of wreck site formation. This particular question has relevance for all of the time periods of concern and should be an element of all studies that discover archeological boat remains in the study area.

The Era of Steam, 1812-1936

1. What is the shipwreck record of commercial and population expansion into smaller waterways? What were the technological adaptations? What were the cargoes?
2. What kinds of information can steamboat wrecks provide on the changes in steamboat usage, cargoes, and technology?

3. What information can shipwrecks provide concerning their changing commercial status as a result of the introduction of the railroad? What types of cargoes did they carry? How did cargoes differ between areas with railroads and areas without railroads?

4. What are the characteristics of the various types of sailing craft used in fishing, oystering, and other economic activities in the area (e.g., the lugger)?

Questions relating to the very earliest periods of steamboat use in the area will be applicable to a small number of well defined water routes. Those relating to the 1865 to 1936 period are generally applicable to all or most of the waterways in the study area. Questions relating to steamboat technology and construction are applicable wherever steamboat wrecks may have occurred. This includes most of the moderate-sized and large waterways and many of the smaller ones in the study area.

Research on the smaller types of commercial craft used in fishing will be most profitable in coastal waterways, as evidenced by the large number of abandoned boats along Bayou du Large. However, vessels, such as luggers, were used far inland on waterways. Preservation of these small vessels is anticipated in a variety of settings, as indicated by the vessels recorded by Pearson and Saltus (1991) along Bayou Shaffer in St. Mary Parish.

The Civil War, 1861-1865

1. What are the locations of specific identified vessels involved in Civil War activity and what are their conditions?

2. What kind of evidence is provided on Civil War shipwrecks concerning the techniques used in altering commercial vessels into war vessels?

3. How do Civil War shipwrecks confirm or conflict the historical documentation concerning their activities, specific engagements or sinkings?

4. What kind of information can be obtained on non-military ship-related (commercial) activity during the Civil War?

Topics related to the Civil War are applicable to, generally, well-defined waterway areas. A number of vessels were sunk or scuttled in Bayou Teche during the Civil War. Although subsequent dredging and demolition have occurred along the waterway, no detailed information on the present condition of these wrecks is available. The shipwrecks in Bayou Teche may represent a useful and significant population for addressing many questions relating to the construction of identified Civil War period boats and for expanding our knowledge about specific military engagements and the impacts of past COE snagging and clearing activities. Two other Civil War vessels are also of interest, the Confederate vessel *Queen of the West* and the United States gunboat *Kinsman*. Recent efforts to find the wreck of the *Kinsman* were unsuccessful, however, available information suggests that the remains of the gunboat lie deeply submerged, and possibly buried, in Berwick Bay near the entrance to Bayou Boeuf (Pearson and Stansbury 2000). The wreck of the *Queen of the West* in Grand Lake was reportedly removed, but considering that the vessel exploded, scattered remains likely exist. The location of the *Queen of the West*, in upper Grand Lake, is an area which is now largely or completely filled with sediment. Therefore, the discovery and examination of this wreck will require a combined geological and archeological approach.

Navigation in the Modern Era, Post 1936

As noted previously, the larger commercial vessels of the recent period are, in general, considered to be less significant in historical and archeological terms than earlier vessels. This is simply because of the abundance of documentary information on the construction and use of these vessels, mitigating the need for their archeological study. However, particular classes of recent vessels and, in some instances, individual vessels will be of research interest. These would include locally-built vessels which are expressive of local boat-building traditions, or, in some instances, those that reflect new traditions or adaptations in boat construction.

A variety of approaches can, of course, be used in addressing the various topics listed above. It is suggested, however, that a framework which identifies certain research procedures and methods applicable to the study area as a whole will aid in the management of its shipwreck resources. Currently, such a framework of research does exist and is ex-

pressed in the procedures employed in the majority of COE-sponsored cultural resources management studies in the region. These procedures are briefly mentioned in the following sections.

Recommendations for the Management of Shipwrecks in the Study Area

It is apparent from the data collected in this study that numerous historic wrecks exist as archeological entities within the study area. This archeological population of wrecks is presently largely unknown, but some of its characteristics can be projected from the small sample of archeologically known wrecks within the study area and the region. This population will include a variety of boat types of various ages, although smaller craft are likely to comprise the majority of the wrecks. It is highly likely that many of these wrecks will be well preserved and largely intact, even in areas where navigation improvements have been conducted. A primary reason for the excellent state of preservation of these archeological entities is related to the geological processes at work in the study area, particularly the high rate of sedimentation in much of the area. Additionally, research on shipwrecks outside of the study area reveals that wreck preservation can occur even in areas where natural processes seem to be conducive to wreck disturbance or destruction. For example, the remains of the eighteenth century Spanish merchantman *El Nuevo Constante* were extremely well preserved and excavation of the vessel produced a large number of ship-related artifacts and cargo items. This was in spite of the fact that the vessel had sunk in the nearshore area of the Gulf of Mexico where wave and current energy is fairly high (Pearson and Hoffman 1995). Similarly, the remains of the steamboat *Ed. F. Dix* and the gunboat *Eastport* are largely intact and well preserved, despite the fact that they have been impacted by the current of a large river, the Red (Pearson and Birchett 1999). Settings similar to those found at the wrecks of *El Nuevo Constante* and the *Dix* and *Eastport* exist throughout the study area.

The available archeological evidence, also, suggests that many of the archeological wrecks in the study area will represent abandonments, such that their loss will never appear in the commonly maintained documentary record of vessel losses. Thus, their discovery will be accomplished primarily through field examination and not from the historical record. However, it is likely that some abandonment areas can be identified or suggested in the historical record, which will aid in designing and directing field research.

As mandated in a variety of Federal regulations, the Corps of Engineers is responsible for the management of cultural resources under its jurisdiction. These regulations have established the policies, procedures and priorities for achieving the responsible and wise management of these resources. The COE has a well-established set of procedures for treating cultural resources, including shipwrecks, which involve: 1) developing an inventory of the resources base, 2) identifying the resource base, 3) evaluating the resources base in terms of significance, 4) assessing project-specific impacts to the resource base, and 5) mitigating those impacts as determined necessary. These procedures are followed for all cultural resources management studies undertaken by the COE and, as relates to shipwrecks, are reflected in a reasonably well-established program of research methods and techniques. These methods and techniques are followed in the majority of shipwreck-related cultural resources management studies undertaken by the COE and have been discussed in Pearson et al (1989) as they relate to the New Orleans District as a whole. The following discussion presents a brief assessment of these procedures as they relate specifically to the study area.

A fairly long history of cultural resources management projects in the study area and surrounding regions has indicated that a program involving historical research; geological research; field investigations incorporating remote-sensing survey and, possibly, pedestrian survey; and physical examination of remains is most productive in discovering boat wrecks. While this program of investigation has proven effective in the past and is considered applicable for future shipwreck studies in the study area, it should not be so rigidly administered or followed as to inhibit the introduction of innovations in approach, interpretation or technology.

Generally, the first phase of research should involve the collection of historical information on the specific waterway or area of concern. The primary objective of this research is to document the history of waterborne activity on the waterway and to identify the number, types and locations of known shipwrecks. Particularly relevant to the study area, is the collection of information on the locations of historic landings, boat yards, etc., because this type of information can lead to the identification of likely boat abandonment areas. As indicated in this study, there

are many public documents relating to navigation improvements in the area that provide information on shipping and shipwrecks. Among the most important of these are the Annual Reports of the Chief of Engineers. It is essential that these resources be examined when working in the study area. Oral interviews are particularly important because a large number of individuals in the study area are involved in boat- or water-related occupations. These persons are often knowledgeable about specific boat wrecks, the history of boat use in particular areas, or about snags or obstructions which may represent wrecks.

A second phase of study that is critically important in the investigation of shipwrecks in the study area is geological research. Geological change in much of the study area is rapid and complex and it has been well established in the foregoing discussions that the geological and geomorphic histories of specific locales are going to play an important role in all aspects of wreck discovery and research. For instance, the natural setting and conditions found along waterways of the study area had a great influence on vessel losses. This was particularly true during the first three-quarters of the nineteenth century when numerous steamboats were lost to snags within the Atchafalaya Basin. Additionally, the post-wreck geomorphic history of a specific location will greatly influence the present condition of any wreck as an archeological entity, it will effect the chances of discovering a wreck and, very importantly, it will influence the types of field techniques which may be most appropriate in wreck discovery. Because of these, and other factors, it is important that site specific geologic histories be a part of all cultural resources management studies undertaken in the study area.

In most instances, the first phase of fieldwork should consist of a reconnaissance, remote-sensing survey of the area of concern. This, in fact, is a standard procedure for most cultural resources studies undertaken by the COE. At a minimum, the survey should utilize a magnetometer and a fathometer. The use of side-scan sonar is partially dictated by field conditions. For example, in areas where a considerable amount of recent sedimentation has occurred, wrecks may be buried and, thus, non-detectable by side-scan sonar. These types of conditions are found throughout much of the study area. These factors do not make side-scan sonar useless, but its employment must be carefully considered relative to field conditions. Along many waterways in the study area, modern trash and debris are found along banklines which can create large magnetic anomalies, potentially obscuring shipwreck magnetics. In some of these instances, side-scan sonar may aid in discriminating between shipwreck remains and non-important debris. Positioning is a critical aspect of water surveys and accuracy and reliability in positioning for essentially all of the types of water surveys conducted in the study area can easily be achieved with differential global positioning systems.

Some very simple field procedures have been used on several cultural resources management projects in the study area which have general applicability. For example, standard pedestrian surveys along banklines can often discover submerged or partially buried watercraft which will not be found by remote-sensing survey because of the shallowness of the water. This approach can be enhanced through the use of probes and/or magnetometers. A pedestrian survey, coupled with probing, was effective in the discovery of several buried boats along the banks of Bayou Shaffer (Pearson and Saltus 1991). There are very many settings in the study area where bankline sedimentation and or accretion have occurred and where this type of field approach is likely to be productive.

The physical verification of a suspected shipwreck is an essential requirement of any cultural resources management study. This may involve diving and, depending upon field conditions, may require the mechanical removal of sediment in order to expose the wreck site. Within the study area, however, some wrecks will be encapsulated in sediment and will now be on dry land. In these instances, standard terrestrial excavation procedures may be appropriate, or a combination of terrestrial and underwater procedures will be required. In some instances, geological techniques, such as coring, may be necessary to locate and/or verify the existence of a deeply buried wreck.

This brief discussion on procedures and techniques is intended only as an outline of procedures which are considered applicable to wreck-related cultural resources studies undertaken in the study area. Essentially, these procedures are those that are now being employed by the COE and an examination of cultural resources management reports from the region will provide numerous examples of the implementation of these procedures.

The priorities of COE management of cultural resources should revolve around the archeological

resource, primarily, because it is this resource which is to be effected by any given COE-sponsored project. Also, it is through the study and evaluation of individual archeological entities that we will expand our understanding about the entire archeological population of wrecks in the region. For example, Stout's recent (1992) reconnaissance along Bayou du Large identified numerous abandoned boats, some of which were likely to be impacted by proposed navigation improvements. These boats, essentially, exist as, or are in the process of becoming archeological sites, and are reflective of presently minimally understood phenomena and conditions found throughout the study area. Careful examination of these boats could address many question about the processes involved in wreck site formation in the study area, in addition to providing information on the boats themselves. The follow-up study by the COE involved the recording of several floating watercraft along Bayou du Large, all of which are still in use (Robinson and Seidel 1995). None of the archeological watercraft identified by Stout were examined. The recordation of the several floating vessels does provide useful descriptive and comparative information, but we learned nothing about the archeological population of wrecks along Bayou du Large. We believe that the priorities of cultural resources management study should be directed toward those known and unknown archeological properties deemed in danger of impact.

As Pearson et al. (1989:305) note, the management of shipwreck resources within the New Orleans District will be made more effective as the archeological data base is expanded. The present study, as a broad overview of a region, does provide general information on wreck occurrences and conditions which will aid in the development of management plans and in the implementation of future cultural resources studies. However, it is in the individual cultural resources study that most new data on wrecks and their expression as archeological properties are collected. Our understanding of shipwrecks within the study area will be expanded as more and more of these studies are undertaken.

REFERENCES

Abbot, Henry L.

1863a *Atchafalaya Basin.* Department of the Gulf, Map No. 8. National Archives and Records Administration, Record Group 77, Map M 99. Copy on file at the Cartographic Information Center, Louisiana State University, Baton Rouge.

1863b *Grand Lake Region.* Department of the Gulf, Map No. 7. National Archives and Records Administration, Record Group 77. Copy on file at the Cartographic Information Center, Louisiana State University, Baton Rouge.

Acts of Louisiana

1834 An Act Relative to Steamboats. Acts Passed, 2nd Session, 11th Legislature, State of Louisiana, pp. 55-59. New Orleans.

Adams, R.D., and Baumann, R.H.

1980 *Land Building in Coastal Louisiana: Emergence of the Atchafalaya Bay Delta.* Center for Wetland Resources, Louisiana State University, Baton Rouge.

Alperin, Lynn M.

1983 *History of the Gulf Intracoastal Waterway.* National Waterways Study, Navigation History NWS-83-8. U.S. Army Engineer Water Resources Support Center, Institute for Water Resources. U.S. Government Printing Office, Washington, D.C.

Arnold, J. Barto, III

1989 *Texas Shipwrecks: Overview of Historic Contexts.* Texas Antiquities Committee, Austin.

Baughman, James P.

1962 *The Maritime and Railroad Interests of Charles Morgan, 1837-1885: A History of the 'Morgan Line.'* Ph.D. dissertation, Tulane University, New Orleans. University Microfilms, Ann Arbor.

1968 *Charles Morgan and the Development of Southern Transportation.* Vanderbilt University Press, Nashville.

Bazet, R.A. (editor)

1934 Houma: An Historical Sketch. In *Centennial Celebration: Houma, Louisiana, May 10-13, 1934*, p. 9-43. King Hanaford, Morgan City, Louisiana.

Becnel, Thomas A.

1989 *The Barrow Family and the Barataria and Lafourche Canal.* Louisiana State University Press, Baton Rouge.

Birchett, Thomas C.C., and Charles E. Pearson

1995 *Historical Assessment and Magnetom-*

eter and Terrestrial Surveys of the Gunboat U.S.S. Eastport *and Steamboat* Edward F. Dix, *Red River Waterway, Grant Parish, Louisiana.* Coastal Environments, Inc., Baton Rouge. Submitted to the Vicksburg District, U.S. Army Corps of Engineers.

Bouchereau, L.
1862-1875 *Statement of the Sugar and Rice Crops Made in Louisiana.* New Orleans.

Bowman, Greg, and Janel Curry-Roper
1982 *The Houma People of Louisiana: A Story of Survival.* United Houma Nation, Inc., Houma, Louisiana.

Brown, John K.
1989 *Limbs on the Levee: Steamboat Explosions and the Origins of Federal Public Welfare Regulations, 1817-1852.* International Steamboat Society, Middlebourne, West Virginia.

Bureau of Marine Inspection and Navigation (BMIN)
1835 Enrollment document for the steamer *Merchant*, Port of Baltimore. Record Group 41, National Archives and Records Administration, Washington, D.C.

———
1865 Enrollment document for the schooner *Thistle*, Port of Mobile. Record Group 41, National Archives and Records Administration, Washington, D.C.

———
1882 Enrollment document for the schooner *Lizzie Haas*, Port of New Orleans. Record Group 41, National Archives and Records Administration, Washington, D.C.

Case, Gladys C.
1973 *The Bayou Chene Story, A History of the Atchafalaya Basin and its People.* Harlo Press, Detroit.

Casey, Powell A.
1983 *Encyclopedia of Forts, Posts, named Camps, and Other Military Installations in Louisiana, 1700-1981.* Claitor's Publishers, Baton Rouge.

Castille, George J. III
1983 *Cultural Resources Survey of Proposed Bridge Corridor, Gulf Intracoastal Waterway, Houma, Louisiana.* Coastal Environments, Inc., Baton Rouge. Prepared for Modjeski and Masters, Inc., New Orleans.

Castille, George J. III
1993 *A Geoforensic Analysis of State-Owned Waterbottoms in South Louisiana: Gauging the Geographical Impacts of Louisiana Court Decisions.* Unpublished Ph.D. dissertation, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

Castille, George J., Charles E. Pearson, Donald G. Hunter, Allen R. Saltus, Jr., Rodney E. Emmer, and Susan Wurtzburg
1990 *Cultural Resources Investigations, Cross Basin Channel Realignments, Atchafalaya Basin, Louisiana.* Coastal Environments, Inc., Baton Rouge. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Chambers, Henry E.
1972 Early Commercial Prestige of New Orleans. *Louisiana Historical Quarterly* 5.

Champomier, P.A.
1841-1862 *Statement of the Sugar Crop Made in Louisiana.* Cook, Young, and Company, New Orleans.

Chapelle, Howard I.
1951 *American Sailing Craft.* W.W. Norton & Company, New York.

Chief of Engineers,
U.S. Army Corps of Engineers (CE)
var. yrs. *Annual Reports of the Chief of Engineers.* Office of the Chief of Engineers, U.S. Army Corps of Engineers. House of Representatives, Executive Documents, Washington, D.C.

Clay, Floyd M.
1983 *History of Navigation on the Lower Mississippi.* Navigation History NWS-83-8. U.S. Army Engineer Water Resources Support Center, Institute for Water Resources, U.S. Government Printing Office, Washington D.C.

Comeaux, Malcolm L.
1972 *Atchafalaya Swamp Life: Settlement and*

Folk Occupations. Geoscience and Man, Vol. 2. School of Geoscience, Louisiana State University, Baton Rouge.

1978 Origin and Evolution of Mississippi River Fishing Craft. *Pioneer America* 10:73-97.

1985 Folk Boats of Louisiana. In *Louisiana Folklife: A Guide to the State*, edited by Nicholas R. Sptizer, pp. 161-178. Louisiana Folklife Program, Department of Culture, Recreation, and Tourism, Baton Rouge.

Conrad, Glenn (editor)
1978 *The Cajuns: Essays on Their History and Culture*. University of Southwestern Louisiana, Lafayette.

Custer, Jack
1994 Gas Boats. *The Egregious Steamboat Journal* 28:8-13.

Detro, Randell A., Donald W. Davis, and Francine Middleton
1979 *Mississippi River Ship and Boat Sinkings From the Delta to Baton Rouge, 1814 to 1979*. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Donovan, Frank
1966 *River Boats of America*. Thomas Y. Crowell Company, New York.

Dunbar, Seymor
1915 *A History of Travel in America*, vol. 1. The Bobbs-Merrill Company, Indianapolis.

Edmonds, David C.
1979 *Yankee Autumn in Acadiana*. The Acadiana Press, Lafayette, Louisiana.

Elliott, D.O.
1932 *The Improvement of the Lower Mississippi River for Flood Control and Navigation*. 3 vols. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg.

Fishbaugh, Charles P.
1970 *From Paddle Wheels to Propellers: The Howard Ship Yards of Jeffersonville in the Story of Steam Navigation on the Western Waters*. Indiana Historical Society, Indianapolis.

Fisk, Harold N.
1952 *Geological Investigation of the Atchafalaya Basin and Problems of Mississippi River Diversion*. 2 vols. U.S. Army Corps of Engineers, Mississippi River Commission, Vicksburg.

Fisk, Harold N., and E. McFarlan
1955 Late Quaternary Deposits of the Mississippi River. In *Crust of the Earth*, pp. 279-302. Special Paper No. 62. Geological Society of America, Boulder, Colorado.

Flayharty, R.A., and J.W. Muller
1983 *Cultural Resources Investigations of a Portion of Bayou Grand Caillou, Terrebonne Parish, Louisiana*. New Orleans District, U.S. Army Corps of Engineers.

Frazier, D.E.
1967 Recent Deltaic Deposits of the Mississippi River: Their Development and Chronology. *Transactions of the Gulf Coast Association Geological Societies* 17:287-315.

Gagliano, Sherwood M. and Johannes L. Van Beek
1970 Geologic and Geomorphic Aspects of Delatic Processes, Mississippi Delta System. In *Hydrologic and Geologic Studies of Coastal Louisiana* 1(1). Coastal Studies Institute, Louisiana State University, Baton Rouge.

Garrison, Ervan G., Charles P. Giammona, Frank J. Kelly, Anthony R. Tripp and Gary A. Wolff
1989 *Historic Shipwrecks and Magnetic Anomalies of the Northern Gulf of Mexico*. 4 vols., U.S. Department of Interior, Minerals Management Service, New Orleans.

Gatschet, Albert S.
1883 *The Shetimasa Indians of St. Mary's Parish, Southern Louisiana*. Transactions of the Anthropological Society of Washington 2:148-158.

Gibbons, Tony
1989 *Warships and Naval Battles of the Civil War*. W.H. Smith Publishers, Inc., New York.

Gibson, Charles E. and E. Kay Gibson
1995 *Dictionary of Transports and Combatant Vessels, Steam and Sail, Employed by the*

Union Army, 1861-1868. Ensign Press, Camden, Maine.

Gibson, Jon L
1978 *Archaeological Survey of the Lower Atchafalaya Region, South Central Louisiana.* Report 5. Center for Archaeological Studies, University of Southwestern Louisiana, Lafayette.

———
1982 *Archeology and Ethnology on the Edges of the Atchafalaya Basin, South Central Louisiana.* Center for Archaeological Studies, University of Southwestern Louisiana. Submitted to the New Orleans District, U.S. Army Corps of Engineers, Contract No. DACW29-79-C-0265.

Goodwin, J.M.
1870 Safety for Travelers. *The Technologist* 1:245-246.

Goodwin, R. Christopher, William P. Athens, and Allen R. Saltus, Jr.
1991 *Evaluation of Magnetic Anomalies Located in Lower Bayou Teche, St. Mary Parish, Louisiana.* R. Christopher Goodwin and Associates, Inc., New Orleans. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Goodwin, R. Christopher, David S. Robinson and John L. Seidel
1995 *Documentation of Several Historic Vernacular Watercraft on Bayou DuLarge, Terrebonne Parish, Louisiana.* R. Christopher Goodwin and Associates, Inc., New Orleans. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Goodwin, R. Christopher and Galloway W. Selby
1984 *Historical Archeology of the Morgan City Floodwall Boat.* R. Christopher Goodwin and Associates, Inc., New Orleans. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Goodwin, R. Christopher, Galloway W. Selby, and Laura A. Landry
1984 *Evaluation of the National Register Eligibility of the M/V Fox, an Historic Boat in Lafourche Parish, Louisiana.* R. Christopher Goodwin and Associates. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Goodwin, R. Christopher, Jill-Karen Yakubik, Galloway W. Selby, Kenneth R. Jones, Debra Stayner , and Janice Cooper
1985a *Cultural Resources Survey of the Morgan City and Vicinity Hurricane Protection Project.* R. Christopher Goodwin and Associates, Inc., New Orleans. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Goodwin, R. Christopher, Jill-Karen Yakubik, Galloway W. Selby, Kenneth R. Jones, Debra Stayner , and Janice Cooper
1985b *An Archaeological and Historic Sites Inventory of Bayou Teche Between Franklin and Jeanerette, Louisiana.* R. Christopher Goodwin and Associates, Inc., New Orleans. Submitted to the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Goodwin, R. Christopher, Jill-Karen Yakubik, Peter Gendel, Herschel A. Franks, and Carol Poplin
1986 *Cultural Resources Survey of the Bayou Courtableau Enlargement Project, St. Landry Parish, Louisiana.* R. Christopher Goodwin and Associates, Inc., New Orleans. Submitted to New Orleans District, U.S. Army Corps of Engineers.

Goodyear, Albert C., L. Marke Raab and Timothy C. Klinger
1978 The Status of Archaeological Research Design in Cultural Resources Management. *American Antiquity* 43(2):159-173.

Gould, Richard A. (editor)
1983 *Shipwreck Anthropology.* School of American Research, University of New Mexico Press, Albuquerque.

Graham, C., and H.S. Tanner
1834 *A Map of the State of Louisiana.* Map on file at the Cartographic Information Center, Louisiana State University, Baton Rouge.

Guidry, Sherwin
1985 *Le Terrebonne: A History of Montegut.* Privately published.

Hackett, Charles W. (editor)
1931 *Pichardo's Treatise on the Limits of Louisiana and Texas: An Argumentative Historical Treatise with Reference to the Verification of the True Limits of the Provinces of Louisiana and Texas; Written by Father Jose Antonio Pichardo, of the Congregation of the Oratory of San Felipe Neri, to Disprove the Claim of the Unites States that Texas was Included in the Louisiana Purchase of 1803*, vol. 1. University of Texas Press, Austin.

Haites, Erik F., James Mak, and Gary M. Walton
1975 *Western River Transportation: The Era of Early Internal Development, 1810-1860.* The Johns Hopkins Press, Baltimore.

Hamilton, Donny L.
1976 Conservation of Metal Objects from Underwater Sites: A Study in Methods. *Miscellaneous Papers Number 4.* The Texas Historical Museum.

Hamilton, Donny L.
1983 Basic Conservation Requirements for Marine Archaeology: Metals and Ceramics. *Proceedings of the Alaskan Marine Archeology Workshop*, pp. 155-182. University of Alaska, Fairbanks.

Harrison, Robert W.
1948 *Land Reclamation in Louisiana Under the Swamp Land Grant of 1849.* Report submitted to the Mississippi River Commission, Vicksburg, Mississippi.

Heinrich, Paul V.
n.d. Chapter 2: Geomorphology of the Atchafalaya Basin. Ms on file, New Orleans District, U.S. Army Corps of Engineers.

Heitmann, John Alfred
1987 *The Modernization of the Louisiana Sugar Industry 1830-1910.* Louisiana State University Press, Baton Rouge and London.

Howell, C.W.
1870 *Survey of the Bayou Teche.* Record Group 77, Map 137-2, Cartographic Division, National Archives and Records Administration, Washington, D.C.

———
1881 *Atchafalaya Survey, Louisiana.* Maps on file at Cartographic Information Center, Louisiana State University, Baton Rouge.

Huber, Leonard V.
1959 *Advertisements of Lower Mississippi River Steamboats 1812-1920.* The Steamship Historical Society of America. West Barrington, Rhode Island.

Hunter, Louis C.
1949 *Steamboats on Western Rivers: An Economic and Technological History.* Harvard University Press, Cambridge.

Hutchins, Thomas
1968 *An Historical Narrative and Topographical Description of Louisiana, and West - Florida.* A Facsimile Reproduction of the 1784 Edition. University of Florida Press, Gainesville.

Irwin, Richard B.
1985 *History of the Nineteenth Army Corps.* Elliott's Book Shop Press, Baton Rouge.

Kelley, David B.
1988 *Archeological and Historical Research on Avoca Plantation: Testing of Site 16 SMY 130 and Survey of Proposed Barrow Areas for EABPL Item E-96, St. Mary Parish, Louisiana.* Coastal Environments, Inc., Baton Rouge. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

King, Peggy E.
1977 *The Effects of Displacement on Levee Dwellers, Atchafalaya Basin, Louisiana.* Unpublished Master's thesis, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

Kniffen, Fred B., Hiram F. Gregory, and George B. Stokes
1987 *The Historic Indian Tribes of Louisiana: From 1542 to the Present.* Louisiana State University Press, Baton Rouge.

Knipmeyer, William B.
1956 *Settlement Succession in Eastern French Louisiana.* Unpublished Ph.D. dissertation, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

Krinitzsky, E.L.
1970 *Correlation of Backswamp Sediments : Atchafalaya Test Section IV, Atchafalaya Levee System, Louisiana.* Waterways Experiment Station, U.S. Army Corps of Engineers, Vicksburg.

Krinitzsky, E L., and F.L. Smith
1969 *Geology of Backswamp Deposits in the Atchafalaya Basin, Louisiana.* Waterways Experiment Station, U.S. Army Corps of Engineers, Vicksburg.

Lafon, B.
1806 *Carte Generale du Territoire D'Orleans Comprenant aussi la Floride Occidentale et une Portion du Territoire du Mississippi.* Map on file at the Cartographic Information Center, Louisiana State University, Baton Rouge.

Landry, Laura Ann
1990 *Plaquemine Locks State Commemorative Area: An Ethnography of Interpretation.* Unpublished Master's thesis, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

Latimer, Rodney A., and Charles W. Schweizer
1951 *The Atchafalaya River Study.* 3 Vols. Mississippi River Commission, U.S. Army Corps of Engineers, Vicksburg.

Lloyd, James T.
1856 *Lloyd's Steamboat and Railroad Directory, and Disasters on the Western Waters.* James T. Lloyd, Philadelphia and Cincinnati.

Louisiana and Lower Mississippi Valley Collections (LLMVC)
n.d. Hinckley Papers Cashbook No. 7. Louisiana and Lower Mississippi Valley Collections, Hill Memorial Library, Louisiana State University, Baton Rouge.

Louisiana and Lower Mississippi Valley Collections (LLMVC)
n.d. J. and A. Perrodin Papers. Louisiana and Lower Mississippi Valley Collections, Hill Memorial Library, Louisiana State University, Baton Rouge.

———
n.d. John Pointer Papers. Louisiana and Lower Mississippi Valley Collections, Hill Memorial Library, Louisiana State University, Baton Rouge.

———
n.d. S.B. *Trader* Register. Louisiana and Lower Mississippi Valley Collections, Hill Memorial Library, Louisiana State University, Baton Rouge.

Louisiana State Archives (LSA)
n.d. Arthur L. Hinckley, Jr. Papers (Microfilm - PP8.1, 2 & 3). Louisiana State Archives, Baton Rouge.

Lowrey, Walter M.
1964 The Engineers and the Mississippi. *Louisiana History* 5(3):233-255.

Lowrie, Walter and Walter S. Franklin (editors)
1834 *American State Papers. Documents, Legislative and Executive, of the Congress of the Unites States, in Relation to the Public lands, from the First Session of the Fourteenth to the First Session of the Eighteenth Congress, Inclusive: Commencing December 4, 1815, and Ending May 27, 1824,* vol. 3. Gales and Seaton, Washington, D.C.

Mancil, Ervin
1972 *An Historical Geography of Industrial Cypress Lumbering in Louisiana.* Ph. D Dissertation, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

McIntire, William G.
1958 *Prehistoric Indian Settlements of the Changing Mississippi River Delta.* Coastal Studies Series No. 1. Louisiana State University, Baton Rouge.

Maygarden, Benjamin, Aubra Lee, Roger Saucier, Melissa Braud, and Jill-Karen Yakubik
1997 *National Register Evaluation of the Bayou Jean Louis Cemetery (16SMY89), Atchafalaya Basin Project, St. Martin Parish, Louisiana.* Earth Search, Inc., New Orleans. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Mississippi River Commission
1884 *Hydrographic Survey of the Mississippi River, 1884.* Mississippi River Commission, Washington, D.C.

Mitchell, C. Bradford (editor)
1975 *Merchant Steam Vessels of the United States, 1790-1868 (The Lytle-Holdcamper List).* The Steamship Historical Society of America, Staten Island, N.Y.

Murphy, Larry, and Allen R. Saltus, Jr.
1981 *Phase II Identification and Evaluation of Submerged Cultural Resources in the Tombigbee River Multi-Resource District, Alabama and Mississippi.* Report of Investigations No. 17. Office of Archaeological Research, the University of Alabama, University, Alabama.

National Archives
1863a Deck Log of the USS *Calhoun*. Record Group 109. National Archives and Records Administration, Washington, D.C.

———
1863b Deck Log of the USS *Estrella*. Record Group 109. National Archives and Records Administration, Washington, D.C.

Naval History Division
1971 *Civil War Chronology 1861-1865*. Compiled by Naval History Division, U.S. Department of the Navy, Washington, D.C.

National Park Service
1982 *How to Apply the National Register Criteria for Evaluation.* National Park Service, U.S. Department of the Interior, Washington, D.C.

———
1985 *National Register Bulletin 20: Nominating Historic Vessels and Shipwrecks to the National Register of Historic Places.* Interagency Resources Division, National Park Service, U.S. Department of the Interior, Washington, D.C.

Newton, Milton B., Jr.
1985 *The Journal of John Landreth Surveyor.* Geosciences Publications, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

Norman, N. Phillip
1942 The Red River of the South (Historical Aspects Pertaining to the Navigation of This River with a Tabulated List of Steamboats, Steamboat Masters, and Way Landings). *Louisiana Historical Quarterly* 25:397-535.

Official Records of the Union and Confederate Armies (ORA)
1885 *Official Records of the Union and Confederate Armies in the War of the Rebellion*, Series 1, Vol. 15. Government Printing Office, Washington D.C.

———
1893 *Official Records of the Union and Confederate Armies in the War of the Rebellion*, Series 1, Vol. 41. Government Printing Office, Washington D.C.

———
1899 *Official Records of the Union and Confederate Armies in the War of the Rebellion* , Series 3, Vol. 3. Government Printing Office, Washington D.C.

Official Records of the Union and Confederate Navies (ORN)
1903 *Official Records of the Union and Confederate Navies in the War of the Rebellion*, Series 1, Vol. 17. Government Printing Office, Washington D.C.

———
1904 *Official Records of the Union and Confederate Navies in the War of the Rebellion*, Series 1, Vol. 18. Government Printing Office, Washington D.C.

———
1905 *Official Records of the Union and Confederate Navies in the War of the Rebellion*, Series 1,Vol. 19. Government Printing Office, Washington D.C.

———
1921 *Official Records of the Union and Confederate Navies in the War of the Rebellion*, Series 2, Vols. 1 and 2. Government Printing Office, Washington D.C.

Pearson, Charles E.
1992 *Examination of a Purported "Treasure Vault" in South Louisiana (The Point Au Fer Site, 16TR257).* Coastal Environments, Inc., Baton Rouge. Submitted to the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

———
1993 The Louisiana State War Schooner *Antonia*: An Historical Foundling. *Louisiana History* 34:461-475.

Pearson, Charles E., and Thomas C.C. Birchett
1999 *The History and Archaeology of Two Civil War Gunboats: The Ironclad Gunboat* USS Eastport *and the Steamer* Ed. F. Dix. Coastal Environments, Inc., Baton Rouge. Draft report submitted to the Vicksburg District, U.S. Army Corps of Engineers.

Pearson, Charles E., George J. Castille, Donald Davis, Thomas E. Redard, and Allen R. Saltus, Jr.
1989 *A History of Waterborne Commerce and Transportation Within the U.S. Army Corps of Engineers New Orleans District and an Inventory of Known Underwater Cultural Resources.* Coastal Environments, Inc. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Pearson, Charles E., and Donald W. Davis
1995 Cultural Adaptation to Landforms in the Mississippi River Delta Plain. *Geological Society of America Field Trip Guide Book 10:239-267.* New Orleans.

Pearson, Charles E., and Paul E. Hoffman
1995 *The Last Voyage of* El Nuevo Constante: *The Wreck and Recovery of an Eighteenth-Century Spanish Ship off the Louisiana Coast.* Louisiana State University Press, Baton Rouge.

Pearson, Charles E., and Allen R. Saltus, Jr.
1989 *Remote Sensing Survey and Evaluation of the American Pass and Blue Point Chute Weirs, Atchafalaya Channel Training Project, Sts. Martin and Mary Parish, Louisiana.* Coastal Environments, Inc., Baton Rouge. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Pearson, Charles E., and Allen R. Saltus, Jr.
1991 *Remote-Sensing Survey of the Atchafalaya Basin Main Channel, Atchafalaya Channel Training Project, Sts. Martin and Mary Parishes, Louisiana.* Coastal Environments, Inc., Baton Rouge. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Pearson, Charles E., and Allen R. Saltus, Jr.
1996 *Underwater Archaeology on the Lower Pearl and West Pearl Rivers, Louisiana and Mississippi. The Examination of 11 Target Areas and Excavation of the Gunboat* CSS Arrow. Coastal Environments, Inc., Baton Rouge. Submitted to the Vicksburg District, U.S. Army Corps of Engineers.

Pearson, Charles E., and Joe J. Simmons, III
1995 *Underwater Archaeology of the Wreck of the Steamship* Mary *(41NU252) and Assessment of Seven Anomalies, Corpus Christi Entrance Channel, Nueces County, Texas.* Coastal Environments, Inc., Baton Rouge. Submitted to the Galveston District, U.S. Army Corps of Engineers.

Pearson, Charles E., and Roland Stansbury
2000 *Evaluation and Analysis of Anomalies Possibly Associated With the* USS Col. Kinsman, Atchafalaya River, Louisiana. Coastal Environments, Inc., Baton Rouge. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Pearson, Charles E., and Tom Wells
1999 *Steamboats on Red River: A History of Waterborne Commerce and an Assessment of Steamboat Losses Along the Red River, Louisiana and Arkansas.* Coastal Environments, Inc., Baton Rouge. Submitted to the Vicksburg District, U.S. Army Corps of Engineers.

Peltier, C.J. Jr., and Lela King Lehmann
19060 *A History of Morgan City, Louisiana.* The Morgan City Historical Society, Morgan City, Louisiana.

Prichard, Walter, Fred B. Kniffen and Clair A. Brown
1945 Southern Louisiana and Southern Alabama in 1819: The Journal of James Leander Cathcart. *Louisiana Historical Quarterly* 28(3):735-921.

Raphael, Morris
1976 *The Battle in the Bayou Country.* Harlo Press, Detroit.

———
1993 *A Gunboat Named* Diana. Harlo Press, Detroit.

Read, William A.
1931 *Louisiana - French.* University Studies, Number 5, Louisiana State University Press, Baton Rouge.

Reed, Merl E.
1966 *New Orleans and the Railroads, The Struggle for Commercial Empire 1830-1860.* Published by the Louisiana State University Press for the Louisiana Historical Association, Baton Rouge.

Roberts, Harry H., A. Bailey, and G.J. Kuecher
1994 Subsidence in the Mississippi River Delta–Important Influences of Valley Filling by Cyclic Deposition, Primary Consolidation Phenomena, and Early Diagenesis. *Transactions of the Gulf Coast Association of Geological Societies* 44:619-629.

Roberts, W. Adolph
1946 *Lake Pontchartrain.* In The American Lake Series, edited by Milo M. Quaife. The Bobbs-Merrill Company, Indianapolis.

Robinson, David S., and John L. Seidel
1995 *Documentation of Several Historic Vernacular Watercraft on Bayou DuLarge, Terrebonne Parish, Louisiana.* R. Christopher Goodwin & Associates, Inc., Frederick, MD. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Saltus, Allen R., Jr.
1985 *Submerged Cultural Resource Investigation of the Western Portion of the Maurepas Basin with Intensive Surveys at Warsaw Landing, Blood River and Springfield Area, Natalbany River, Louisiana.* Submitted to the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Saltus, Allen R., Jr.
1986 *Submerged Cultural Resource Investigation of the Western Portion of the Maurepas Basin with Intensive Underwater Surveys at Hoo Shoo Too Landing, 16EBR60, Colyell Bay, Catfish Landing, and at the Mouth of Bayou Chene Blanc.* Submitted to the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

———
1987 *Submerged Cultural Resources Investigation of the Western Portion of the Maurepas Basin.* Submitted to the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

———
1988 *Submerged Cultural Resources Investigation of Various Waterways of Lake Pontchartrain's North Shore.* Southeastern Louisiana University. Submitted to the Division of Archaeology, Louisiana Department of Culture, Recreation and Tourism, Baton Rouge.

Saltus, Allen R., Jr., Benjamin Maygarden, and Roger T. Saucier
2000 *Analysis and Technical Report of Remote Sensing Data for the* USS Kinsman. Earth Search, Inc., New Orleans. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Saucier, Roger T.
1994 *Geomorphology and Quaternary Geologic History of the Lower Mississippi Valley.* U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Scharf, J. Thomas
1977 *History of the Confederate States Navy From its Organization to the Surrender of its Last Vessel.* Reprint. The Fairfax Press, New York.

Schiffer, Michael B. (editor)
1978 Contributions to Archaeological Method and Theory. *American Antiquity* 43(2).

Seidel, John L., David S. Robinson, and Adam Kane
1998 *Marine Remote Sensing Survey of the Atchafalaya Ocean Dredged Material Disposal Site, Louisiana.* R. Christopher Goodwin & Associates, Inc., New Orleans. Submitted to the New Orleans District, U.S. Army Corps of Engineers.

Silverstone, Paul H.
1989 *Warships of the Civil War Navies.* Naval Institute Press, Annapolis, Maryland.

Sitterson, J. Carlyle
1953 *Sugar Country: The Cane Sugar Industry in the South, 1753-1950.* University of Kentucky Press, Lexington.

Smith, Lawson M., Joseph B. Dunbar, and Louis D. Britsch
1986 *Geomorphological Investigation of the Atchafalaya Basin, Area West, Atchafalaya*

Delta, and Terrebonne Marsh. 2 Vols. Technical Report GL-86-3. Waterways Experiment Station, U.S. Army Corps of Engineers, Vicksburg.

Stout, Michael E.
1992 *A Reconnaissance Survey of Derelict Boats on Bayou DuLarge, Terrebonne Parish, Louisiana.* Planning Division, New Orleans District, U.S. Army Corps of Engineers.

Surrey, N.M. Miller
1916 *The Commerce of Louisiana During the French Regime, 1699-1763.* Columbia University Studies in History, Economics, and Public Law 61(1). Columbia University, New York.

Swanton, John R.
1911 *Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico.* Bulletin 4. Bureau of American Ethnology, Smithsonian Institution, Washington D.C.

Swift, W.H.
1829 *Map of the Territory of Florida From its Northern Boundary to Lat: 27° 50'N, Connected with the Delta of the Mississippi.* Copy of map on file at Coastal Environments, Inc., Baton Rouge.

Switzer, William F.
1889 *Report of the Internal Commerce of the United States.* Special Report, Treasury Department, House of Representatives, Executive Document 6, Part 2. Government Printing Office, Washington.

Taggart, Robert
1983 *Evolution of the Vessels Engaged in the Waterborne Commerce of the United States.* National Waterways Study, Navigation History NWS-83-3. U.S. Army Engineer Water Resources Support Center, Institute for Water Resources. Government Printing Office, Washington, D.C.

Taylor, Joel G.
1976 *Louisiana.* W. W. Norton and Company, Inc., New York.

Terrell, Bruce G.
1990 *Louisiana Submerged Cultural Resource Management Plan.* Department of Culture, Recreation, and Tourism; Office of Cultural Development; Division of Archaeology; Baton Rouge.

Tornqvist, T.E., T.R. Kidder, W.J. Autin, K. van der Borg, A.F.M. de Jong, C.J.W. Klerks, E.M.A. Snijders, J.E.A. Storms, R.L. van Dam and M.C. Wiemann
1996 A Revised Chronology of Mississippi River Subdeltas. *Science* 271:1693-1696.

United States Army Corps of Engineers
1974 *Environmental Statement: Atchafalaya Basin, Louisiana.* Appendix, Basic Hydrologic Data. Louisiana Sedimentation Ranges, Plates 209-238, File No. H-2-26753. New Orleans District, U.S. Army Corps of Engineers.

———
1982 *Atchafalaya Basin Floodway System, Louisiana: Feasibility Study, Vol. 2, Appendix A.* New Orleans District, U.S. Army Corps of Engineers.

1987a *Clam Shell Dredging in Lake Pontchartrain and Maurepas, Louisiana.* Draft Environmental Impact Statement. U.S. Army Corps of Engineers, New Orleans.

1987b *Oyster Shell Dredging in the Atchafalaya Bay and Adjacent Waters, Louisiana.* Draft Environmental Impact Statement. U.S. Army Corps of Engineers, New Orleans.

United States Army Corps of Engineers
1997 *Revised Scope of Services: Historic Navigation and Shipwreck Study, Lower Atchafalaya Basin Reevaluation Study, South Central Louisiana.* Dated April 28, 1997. Planning Division, New Orleans District, U.S. Army Corps of Engineers.

United States Congress
1857 *Commerce, Tonnage, etc., of the Ohio and Other Western Rivers.* Department of War. House of Representatives, Executive Document 48, 34th Congress, 3rd Session, Serial Set No. 900. Government Printing Office, Washington, D.C.

United States Department of Commerce
1918 *Annual List of Merchant Vessels of the United States With Official Numbers and Signal Letters and Lists of Vessels Belonging to the United States Government With Distinguishing Signals.* Bureau of Navigation, United States Department of Commerce. Government Printing Office, Washington, D.C.

Unites States Department of the Interior
n.d. *Secretary of the Interior's Standards for Preservation Planning.* Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines, Washington, D.C.

Unites States Shipping Board
1918 *Second Annual Report of the United States Shipping Board.* Government Printing Office, Washington, D.C.

United States Topographic Bureau
n.d. *Sketch of Atchafalaya Bay.* A circa-1830 map by the Engineer Department, United States Topographic Bureau. National Archives and Records Administration, Washington, D.C. Copy in the collections of Roland Stansbury, Morgan City, Louisiana.

Watkins, Margaret E.
1937 *The History of Terrebonne Parish to 1860.* Unpublished Master's thesis, Department of History, Louisiana State University, Baton Rouge.

Watts, Gordon P., Jr.
1985 Towards Establishing Research and Significance Criteria for Civil War Shipwreck Resources. *Proceedings of the Sixteenth Conference on Underwater Archaeology, Special Publication Series* 4:133-137. Society for Historical Archaeology.

Way, Frederick, Jr.
1994 *Way's Packet Directory, 1848-1994.* Ohio University, Athens, Ohio.

Way, Frederick, Jr., and Joseph W. Rutter
1990 *Way's Steam Towboat Directory.* Ohio University Press, Athens, Ohio.

Weinstein, Richard A., and David B. Kelley
1992 *Cultural Resources Investigations in the Terrebonne Marsh, South-Central, Louisiana.* Coastal Environments, Inc., Baton Rouge. Submitted to the New Orleans District, U.S. Army corps of Engineers.

Whelan, Jamie P., and Charles E. Pearson
1999 *Archaeology of an Early Twentieth Century Black Community: The Good Land Cypress Sawmill Company, Terrebonne Parish, Louisiana.* Coastal Environments, Inc., Baton Rouge. Submitted to the Louisiana Department of Transportation and Development, Baton Rouge.

Wicker, Karen M.
1983 Cufoff Bendways and the Legal Dilemma Regarding Property Ownership. *Proceedings of the Conference on Rivers '83.* Waterway, Port, Coastal, and Ocean Division, ASCE, New Orleans, October 24-26.

Williams, S. Jefferes, Shea Penland, and Asbury H. Sallenger, Jr., Editors
1992 *Atlas of Shoreline Changes in Louisiana from 1853 to 1989.* Prepared by the United States Geological Survey in cooperation with the Louisiana Geological Survey. U.S. Geological Survey, U.S. Department of the Interior, Reston, Virginia.

Winters, John D.
1963 *The Civil War in Louisiana.* Louisiana State University Press, Baton Rouge.

Work Projects Administration (WPA)
1938 *Wreck Reports: A Record of Casualties to Persons and Vessels on the Mississippi River, Its Tributaries, on Lakes and Other Waterways of the U.S. Customs District, Port of New Orleans, 1873-1924.* Survey of Federal Archives in Louisiana, Services Division. Manuscript on file at Louisiana State Library, Baton Rouge.

———
1942 *Ship Registers and Enrollments of New Orleans, Louisiana, 1804-1870.* 6 vols. Survey of Federal Archives in Louisiana, Service Division. Manuscript on file at Louisiana State Library, Baton Rouge

Wurzlow, Helen Emmeline
1985 *I Dug up Houma Terrebonne*. 7 vols. Published by Helen Emmeline Wurzlow, Houma.

Newspapers

Houma Daily Courier. Microfilm collections, Hill Memorial Library, Louisiana State University, Baton Rouge.

Morgan City Outlook. Microfilm collections, Morgan City Archives, Morgan City, Louisiana.

New Orleans Daily Picayune. Microfilm collections, Hill Memorial Library, Louisiana State University, Baton Rouge.

Planters Banner. Microfilm collections, Morgan City Archives, Morgan City, Louisiana.

APPENDIX A

KEY TO WATERCRAFT WRECK INFORMATION FORM

KEY TO WATERCRAFT WRECK INFORMATION FORM

GENERAL INFORMATION

1. BOATNAME: name or UNKNOWN (26)*

2. REFNUMBER: arbitrary, assigned (5)

3. LANUMBER: trinomial Louisiana state site number if assigned or UNKNOWN (8)

4. DATELOST: Mo; Day; Year or UNKNOWN (10)

5. LOSSCAUSE: cause of loss. (20)

ABANDONED
BEACHED
BROKE UP
BURNED
CAPSIZED
COLLISION
EQUIPMENT FAILURE
EXPLOSION
FOUNDERED
SANK IN STORM
SCUTTLED
SNAGGED
STRANDED & SWAMPED
SUNK IN BATTLE
UNKNOWN

6. WATER BODY: Waterbody in which loss occurred (30)

Rivers
AMITE RIVER
ATCHAFALAYA RIVER
BELLE RIVER
BLIND RIVER
BLOOD RIVER
BOGUE FALAYA RIVER
CALCASIEU RIVER
GRAND RIVER
MERMENTAU RIVER
MISSISSIPPI RIVER
NATALBANY RIVER
OLD RIVER
PONCHATOULA RIVER
RED RIVER
TANGIPAHOA RIVER
TCHEFUNCTE RIVER
TICKFAW RIVER
VERMILION RIVER

Bays
ADAMS BAY
ATCHAFALAYA BAY
BARATARIA BAY
BAY OF NATCHEZ (SAME AS LAKE)
BERWICK BAY
TERREBONNE BAY
TIMBALIER BAY
VERMILION BAY

Passes
BALIZE PASS (MISS R.)
CALCASIEU PASS
CHICOT PASS
GRAND PASS (MISS R.)
PASS FOURCHON
PASS A LOUTRE (MISS R.)
PASS MANCHAC
RIGOLETS PASS
SOUTHEAST PASS (MISS R.)
SOUTH PASS (MISS R.)
SOUTHWEST PASS (MISS R.)

* Field length in parenthesis.

Bayous

12 MILE BAYOU
BAYOU BAPTISTE COLLETTE
BAYOU BARATARIA
BAYOU BEDICO (CREEK)
BAYOU BLACK
BAYOU BOEUF
BAYOU BONFOUCA
BAYOU CHEVAL
BAYOU CHICOT
BAYOU COCODRIE
BAYOU COLYELL (SAME AS CREEK)
BAYOU COOK
BAYOU COURTABLEAU
BAYOU DES ALLEMANDS
BAYOU DES GLAISES
BAYOU DULAC
BAYOU DULARGE
BAYOU FELIX
BAYOU GRAND CAILLOU
BAYOU GROSS TETE
BAYOU LA CACHE
BAYOU LA LOUTRE
BAYOU LA ROMP
BAYOU LACOMBE
BAYOU LAFOURCHE
BAYOU LONG
BAYOU LUCACHE
BAYOU MANCHAC
BAYOU NEZ PIQUE
BAYOU PEROT
BAYOU PETIT CAILLOU
BAYOU PIGEON
BAYOU PLAQUEMINE
BAYOU SALE
BAYOU SORREL
BAYOU ST. DENIS
BAYOU ST. JOHN
BAYOU TECHE
BAYOU TERREBONNE
BAYOU TIGRE
CROOKED BAYOU
CROSS BAYOU
DEADMAN'S BAYOU
FROG BAYOU
GRAND BAYOU
LACASINE BAYOU
LIBERTY BAYOU
LITTLE COCODRIE BAYOU
OYSTER BAYOU
THREE MILE BAYOU
TREASURE BAYOU
VERMILION BAYOU
WILKINSON BAYOU

Manmade Channels
ALGIERS CANAL
BARATARIA WATERWAY
EMPIRE CANAL
EMPIRE WATERWAY
GULF INTERCOASTAL WATERWAY
HARVEY CANALS 1 & 2
MICHOUD CANAL
MISSISSIPPI RIVER GULF OUTLET
NEW BASIN CANAL
OUTFALL CANAL
SW LOUISIANA CANAL
WAX LAKE OUTLET

Lakes
CALCASIEU LAKE
CATAHOULA LAKE
GRAND LAKE (2)
LAKE BORGNE
LAKE BULLY CAMP
LAKE CHARLES
LAKE CHICOT
LAKE DES ALLEMANDS
LAKE MAUREPAS
LAKE PONTCHARTRAIN
LAKE SALVADOR
LOWER MUD LAKE
PRIEN LAKE
SIX MILE LAKE

Sounds
BRETON SOUND
CAT ISLAND CHANNEL
CHANDELEUR SOUND
MISSISSIPPI SOUND
ST. GEORGE SOUND

Gulf
GULF OF MEXICO

Miscellaneous
BAYOU CHINCHUBA SWAMP
BRYSON SWAMP
LOUISIANA MARSH
UNKNOWN

7. PARISH: Parish in which loss occurred. Multiple parishes are given when location is questionable. (35)

ACADIA
ASCENSION
ASSUMPTION
AVOYELLES
CALCASIEU
CAMERON
EAST BATON ROUGE
EAST FELICIANA
EVANGELINE
IBERIA
IBERVILLE
JEFFERSON
JEFFERSON DAVIS
LAFAYETTE
LAFOURCHE
LIVINGSTON
ORLEANS
PLAQUEMINES
POINTE COUPEE
ST. BERNARD
ST. CHARLES
ST. HELENA
ST. JAMES
ST. JOHN THE BAPTIST
ST. LANDRY
ST. MARTIN
ST. MARY
ST. TAMMANY
TANGIPAHOA
TERREBONNE
VERMILION
WEST BATON ROUGE
WEST FELICIANA
UNKNOWN

8. NEARCOMM: Community or landmark nearest the loss as provided in wreck reference or determined from locational data or UNKNOWN (15)

9. SRM: Standard river mile (provided for Mississippi River when available) or UNK (5)

10. MAPREF: Refers to the map on which a wreck is depicted when loss information is derived from the map. (7)

A. quadrangle (number system ex. Q-201-A) (scale 1:62,500 or 1:24,000)
B. "T" chart = (ex.: T-1023)
C. "N" chart = (ex.: N-1001)
D. "H" = historic
E. "C" chart = C & GS, or coast & harbor survey
F. other
NM. locational information not derived from a map

11. MAP DATE: year of historic map or chart on which wreck is depicted (4)
    NM = locational information is not derived from a map

12. LATITUDE: (8) 00-00-00

13. LONGITUDE: (8) 00-00-00

14. LORANREF1: value or UNKNOWN (11)

15. LORANREF2: value or UNKNOWN (11)

16. ZONE: (3)

17. UTMEAST: (6)

18. UTMNORTH: (7)

19. LOCRELIAB: Reliability of available information on the location of the wreck (3)
    01 Wreck confirmed through physical verification; location is entirely reliable
    02 Specific wreck location reported by informant, described in literature, or shown on map; good reliability
    03 General wreck location reported by informant or literature; fair to poor reliability
    04 Unreliable locational information or no locational information

VESSEL DESCRIPTION
(measurements in feet)

20. LENGTH: in feet (4)
    UNK = unknown

21. WIDTH in feet (beam): (3)
    O = unknown

22. DEPTHHOLD: To nearest tenth of a foot (4)
    O.O = unknown

23. DRAFT: To nearest tenth of a foot (4)
    O.O = unknown

24. TONNAGE: (5)
    UNK = unknown

25. DATEBUILT (year): (4)
    O = unknown

26. WHEREBILT: Where the vessel was built (3)

ABD = Aberdeen, OH
ABV = Abbeville, LA
AGL = Angola, LA
ALB = Albany, LA
ALG = Algiers, LA
ALI = Alton, IL
ALT = Alto, LA
ALX = Alexandria, LA
APF = Apalachicola, FL
ARL = Amite River (LA)
ASP = Ascension Parish (LA)
AST = Astoria, NY
ATB = Atchafalaya Bay (LA)
ATF = Atchafalaya River (LA)
BAR = Barataria, LA
BBL = Breaux Bridge, LA
BCL = Bayou Cook (LA)
BDL = Bayou Dularge (LA)
BFL = Bonfouca, LA
BGC = Bayou Grand Caillou (LA)
BHM = Bohemia, LA
BIL = Biloxi, MS
BLA = Bayou Lacombe (LA)
BLF = Bayou Lafourche (LA)
BLZ = Belize
BMD = Baltimore, MD
BMT = Beaumont, TX
BNC = Bluefields, Nicaragua
BNT = Bay Natchez (LA)
BNY = Brooklyn, NY
BPA = Brownsville, PA
BRL = Blind River (LA)
BRM = Brunswick, MO
BRO = Baresville, OH
BRP = Bridgeport, PA
BSA = Bayou Sale (LA)
BSJ = Bayou St. John, (LA)
BSL = Bay St. Louis, MS
BSM = Boston, MA
BSR = Bayou Sara, LA
BTL = Bayou Teche (LA)
BTM = Timbalier Bay (LA)
BTN = Bayou Terrebonne (LA)
BTR = Baton Rouge, LA
BUR = Buras, LA
BVA = Bera, VA
BVN = Belle Vernon, PA
BVP = Beaver, PA
BVR = Vermilion Bayou (LA)
BWD = Burwood, LA
BWK = Berwick, LA
BWT = Brownsville, TX
BYS = Bayou Sara (LA)
CAM = Cameron, LA
CAO = Cairo, KY
CAP = California, PA
CBN = Caibarien, Cuba
CCT = Corpus Christi, TX
CDS = Cadiz, Spain
CHC = Chicago, IL
CHI = Chandeleur Islands (LA)
CHL = Chauvin, LA
CLM = Columbia, MS
CMA = Camden, AR
CMM = Campeche, Mexico
CNL = Connelsville, OH
CNO = Cincinnati, OH
CNV = Centreview, OH
COV = Covington, LA
CPL = Calcasieu Parish (LA)
CPS = Calcasieu Pass (LA)
CRL = Charenton, LA
CRM = Carondelet, MO
CRP = Chrisler, PA
CRV = Caracas, Venezuela
CSC = Charleston, SC
CSL = Calcasieu, LA
CTI = Cat Island, MS
CTV = Centerville, LA
CUB = Cuba
DEL = Delaware
DEM = Detroit, MI
DGA = Darien, GA
DON = Donaldsonville, LA
DRI = Dernieres Island, LA
DUN = Dunbar, LA
EBM = East Boston, MA
EBT = East Baton Rouge (LA)
ELB = Elizabeth, PA
EMP = Empire, LA
ENG = England
EPA = E. Pascagoula, MS
EPR = E. Pearl River (LA)
ETP = Elizabethtown, PA
EVI = Evansville, IN
FAL = Fairhope, AL
FDP = Frederickstown, PA
FJN = Fort Jackson, LA
FLA = Florida
FLO = Fulton, OH
FMF = Ft. Meyers, FL

FNL = Franklin, LA
FPA = Freedom , PA
FRI = Fredonia, IN
FTM = Frontera, Mexico
GAL = Galveston, TX
GCL = Grand Chenier, LA
GIS = Grand Isle, LA
GLI = Galena, IL
GLO = Gallipolas, OH
GNO = Genoa
GNR = Grand River (LA)
GRC = Grand Caillou (LA)
GRM = Greenwood, MS
GRN = Greenwood Plantation (LA)
GRT = Gretna, LA
GUV = Guyandotte, VA
HAR = Harmar, OH
HAT = Hattiesburg, MS
HLA = Helena, AR
HLO = Houts Landing, OH
HMA = Houma, LA
HOB = Hoboken, NJ
HOP = Head of Passes (LA)
HOT = Houston, TX
HRI = Horn Island, MS
HRL = Harrisonburg, LA
HTI = Haiti
HVN = Havanna
IID = Indianapolis, IN
IRN = Ironton, OH
JEA = Jeanerette, LA
JFC = Jefferson City, LA
JFI = Jeffersonville, IN
JFL = Jacksonville, FL
JOI = Joliet, IL
JPL = Jefferson Parish (LA)
KKI = Keokuk, IA
KNV = Kennerville, (?)
KPT = Keyport, NJ
LA = Louisiana
LAC = Lacasine, LA
LAF = Lafayette, LA
LAI = Last Island, LA
LAK = Lake Charles, LA
LAR = Larose, LA
LBR = Lake Bornge (LA)
LCA = Locust Fork, AL
LDA = Lake Des Allemands (LA)
LEK = Leestown, KY
LGL = Linn Grove, LA
LKP = Live Oak Plantation (LA)
LMR = Louisiana Marsh
LOF = Lafourche, LA
LOK = Louisville, KY
LPE = Liverpool, England
LSP = Louisiana Swamp
LSV = Leesville, LA
LTB = Little Bayou (LA)
LUT = Lutcher, LA
LVI = Liverpool, IL
LVL = Lake Verret (LA)
MAD = Madisonville, LA
MAI = Marsh Island, LA
MAN = Manchac, LA
MCI = Mound City, IL
MDI = Madison, IN
MDV = Mandeville, LA
MEI = Metropolis, IL
MET = Memphis, TN
MEX = Mexico
MGC = Morgan City, LA
MIL = Millerville, LA
MKT = McKeesport, PA
MLV = Melville, LA
MLW = Melrose, WI
MMT = Mermentau, LA
MOA = Mobile, AL
MOP = Monongahela, PA
MPA = Manchester, PA
MRO = Monroe, LA
MRR = Mouth of the Red River
MRV = Murraysville, VA
MTM = Monticello, MA
MTO = Marietta, OH
NAI = New Albany, IN
NCH = Natchitoches, LA
NLC = New London, CN
NNY = Newburgh, NY
NO = New Orleans, LA
NPL = Naples
NRC = Norwhich, CN
NRO = New Richmond, OH
NST = Nashville, TN
NTC = Nestor Canal (LA)
NTZ = Natchez, MS
NWI = New Iberia, LA
NY = New York
NYC = New York City, NY
OAR = Ouachita River (LA)
OGP = Orange Grove Plantation (LA
OKH = Oshkosh, WI
OLG = Olga, LA

OPP = Oporto, Portugal
ORT = Orange, TX
PA = Pennsylvania
PAM = Pascagoula, MS
PAN = Perth Amboy, NJ
PAT = Patterson, LA
PCO = Pipe Creek, OH
PDK = Paducah, KY
PDS = Port Eads, LA
PEN = Pensacola, FL
PIT = Pittsburg, PA
PKA = Pocahontas, ARK
PKV = Parkersburg, VA
PLD = Philadelphia, PA
PLL = Plaquemine, LA
PLR = Pearl River (LA)
PMA = Pass Manchac (LA)
PMO = Pomeroy, OH
POK = Portland, KY
PON = Ponchatoula, LA
POO = Portsmith, OH
PRG = Progesso (?)
PRI = Prophet's Island (LA)
PTC = Puerto Cortez
QTL = Qumtaran's Landing
RDL = Red River Landing (LA)
RDM = Rodney, MS
RIO = Ripley, OH
RSL = Reserve, LA
RTN = Tensas River (LA)
SAF = St. Augustine, FL
SB = Shell Beach (LA)
SBP = Sabine Pass (LA/TX)
SBT = Sabine, TX
SCI = Silvercreek, IN
SDL = Sodo Lake
SHI = Ship Island, MS
SHK = Shipping Port, KY
SHL = Shilo
SHP = Shreveport, LA
SIN = Staten Island, NY
SJI = St. Joseph Island (LA)
SLD = Slidell, LA
SLM = St. Louis, MO
SLP = Stella Plantation (LA)
SMK = Smithland, KY
SMV = St. Martinville, LA
SPM = St. Paul, MN
SPR = Springfield, LA
SPS = South Pass (LA)
SPY = Sarpy, LA
SSA = St. Stephens, LA
SSL = Ship Shoal, LA
SST = Savoire Station, LA
STB = Steubenville, OH
STD = Strader, LA
STJ = Saint James, LA
STP = Shousetown, PA
TAB = Tabasco, Mexico
TAN = Tangipahoa, LA
TBL = Timbalier Bay (LA)
THB = Thibodaux, LA
THT = Theriot, LA
TIG = Tigerville, LA
TMI = Timbalier Island (LA)
TML = Three Mile Bayou (LA)
TMP = Tampico, Mexico
TPF = Tampa, FL
TRL = Tchefuncte River (LA)
TRY = Troy, NY
US = USA
VCM = Veracruz, Mexico
VKB = Vicksburg, MS
VLT = Violet, LA
VMB = Vermilion Bay (LA)
VNL = Venice, LA
WAD = Wadesboro, LA
WAL = Wallace, LA
WAS = Washington, LA
WAW = Warrenton, WI
WBT = West Baton Rouge (LA)
WEL = Wellsville, OH
WEP = West Elizabeth, PA
WID = Wilmington, DEL
WVA = Wheeling, VA
WWO = Westwego
WWV = Wheeling, W.VA
UNK = Unknown

27. HMPORT: waterbody or city and state/country of home port (3)
See item #26 for list of abbreviations.

28. VESLTYPE (15)

airboat
barge
barkentine
barque
bateau
battleship
brigantine
buoy tender
cabin cruiser
canal boat
canoe
caravel
charter boat
clipper
commercial boat
corvette
crewboat
derrick barge
dredge
dugout canoe
ferryboat
fishing vessel
flat boat
freighter
frigate
galleon
galley
gas stern wheel
gunboat
hopper barge
houseboat
ironclad
Jo-boat
keel boat
kitch
lafitte skiff
launch
lighter
lugger
merchant brigantine
merchant
motor-sailor
motor vessel
oil stern wheel
oyster boat
packet
paddle boat (paddle wheel)
patrol boat
pilot boat
pirogue (board)
pirogue (dugout)
pleasure craft
pontoon boat
power boat
raft
RR drilling barge
sailboat
schooner
schooner/barge
scow
ship
showboat
shrimp boat
side wheel
skiff
sloop
steamboat (steamer)
stern wheel
submarine
tanker
tow boat
trawler
tug boat
tug or tow boat
yacht
unknown

29. PROPULSION: Propulsion system as given in the historical documentation (10)
DS = diesel screw
GA = gas
GS =gasoline screw
OR = oar
OS = oil screw
PU = pulled
SA = sail
SM = steam
SP = screw & paddle wheel
SS = steam - screw
ST = steam - paddle wheel
TW = towed
UNKNOWN

30. MATERIAL: General description of the material from which the vessel was built if given in historical documentation (10)
CC = cotton clad
CY = cypress
IC = iron clad
MT = metal
ST = steel
TC = tin clad
WD = wood
WM = wood & metal
UNKNOWN

31. VESSELUSE: (10)
PC = passenger carrier
CC = cargo carrier
CP = cargo & passenger carrier
TA = tanker
WA = warship
TU = tug or tow boat
SU = survey vessel
SP = steam diving bell boat
HF = hunting/fishing
TC = timber collecting
CV = construction vessel
SV = supply vessel
UNKNOWN

32. ARMAMENT: Number of cannons, guns, or mortars as given in historical documents. (2)
O = Unknown

33. CARGO: Cargo carried by vessel at time of loss if given in historical documentation (20)
BRI = brick
COL = coal
COT = cotton
FMC = farm machinery
GRA = grain
LIM = lime
LIQ = liquid
LUM = lumber
MOL = molasses
MSC = miscellaneous cargo
OIL = petroleum products
ORD = military ordinance
POT = potatoes
PRM = precious metals
PRS = prisoners, prison made goods
RIC = rice
SPE = species or coin money
SUG = sugar
UNKNOWN

34. ORIG: Waterbody or city and state/country of origin of the vessel on final voyage if given (3)
See item #26 for list of abbreviations.

35. DEST: Waterbody or city and state/country of destination of the vessel on final voyage if given (3)
See item #26 for list of abbreviations.

WRECK SITE INFORMATION

36. WATERDEPT: Depth of water at site of loss if known (4)
O = Unknown or unreported depth

37. BOTTOMTYP: Bottom type at site of loss if known (6)
MD = mud
SA = sand
UNK = unknown

38. PHYSLOCAT: General physical setting of site of loss if given in historical documentation (8)
BE = beach
CB = cut bank
LB = left descending bank
LD = landing
PB = point bar
RB = right descending bank
RC = reach
SF = sea floor
UNKNOWN

39. CONDSTAT: Condition of the wrecks (10)
    01 = good, hull intact
    02 = moderate damage
    03 = poor, deteriorated
    04 = reportedly removed, condition unknown
    05 = reportedly partially removed, condition unknown
    06 = reportedly removed by demolition, condition unknown
    07 = reportedly removed - refloated
    08 = possibly removed or refloated (not reported or confirmed)
    09 = removal confirmed
    UNKNOWN = no data available

40. WRECKEXPO: Degree and nature of exposure of the wreck (6)
    01 = entirely submerged below water
    02 = partially exposed above water
    03 = entirely buried below floor of water body
    04 = below surface of water, partially buried by sediment
    05 = on land, entirely buried by sediment
    06 = on land, partially exposed to air
    UNK = unknown

41. MATCOLLEC: Four most common types of remains collected from the wreck site (10)
    ME = metal
    CE = ceramics
    GL = glass
    BO = bone
    WO = wood
    LE = leather
    ND = no data

DOCUMENTATION

42. RSDATA: Remote sensing data on wreck site (6)
    MA = magnetometer
    SS = sidescan sonar
    SP = subbottom profiler
    ND = no data available

43. UNPUBDATA: Type of unpublished information available for wreck (12)
    FN = field notes
    PH = photographs
    SM = sketch maps
    AD = artifact description
    TI = taped interviews
    ND = no data available

44. DATALOC: Physical location of unpublished data records (12)
01 = Coastal Environments, Inc., 1260 Main Street, Baton Rouge, LA 70802
02 = Allen R. Saltus, P.O. Box 88, Prairieville, LA 70769
03 = Division of Archaeology, P.O. Box 44247, Baton Rouge, LA 70804
04 = John Chance & Assoc., P.O. Box 52029, Lafayette, LA 70506
05 = Corps of Engineers, New Orleans District, Foot of Prytania Street, New Orleans, LA 70160
UNKNOWN

45. PUBREF: Published references from which shipwreck information has been collected, given are author, date, and title (80)
ARCE = Annual Report of the Chief of Engineers, miscellaneous years.
ARCHIVES = Miscellaneous WPA Wreck and Navigation Reports
Bellin N 1744 = Carte Des Embouchures Du Mississippi
Berman, 1972 = Berman, Bruce D., 1972
Encyclopedia of American Shipwrecks.
Mariners Press, Boston
Bragg, 1977 = Bragg, Marion. *Historic Names and Places on the Mississippi River.* Mississippi River Commission.
CD, 1892 = Congressional Documents. Examinations & Surveys in New Orleans Engineer District, Vol 2. 1878 -1914
CEI (#) = Cultural Resources Evaluation of the Northern Gulf of Mexico Continental Shelf. Coastal Environments, Inc. Shipwreck data sheets.
CRSBC 1986 = *Cultural Resources Survey of the Bayou Courtableau Enlargement Project,* St. Landry Parish, La. By: R. Christopher Goodwin, Jill-Karen Yakubik, Peter Gendel, Herschel A. Franks, & Carol Poplin.
Detro, 1979 = Detro, Randall A., Davis, Donald W., Middleton, Francine, 1979.
Flayharty, 1983 = Flayharty, R.A. and J.W. Muller. Cultural Resource *Investigations of a Portion of Bayou Grand Caillou, Terrebonne Parish, La.* U.S. Army Corps of Engineers, New Orleans District. (Number assigned by U.S. Army Corps of Engineers is given).
GSRI, 1973 = Gulf South Research Institute
Environmental Inventory for the Mississippi River - Cario, Illinois to Venice, Louisiana. 4 vols. (prepared for U.S. Army Corps of Engineers, Vicksburg District).
HFTL, 1959 = Hodge, Frederick W. & Theodore Lewis
Spanish Explorers in the Southern U.S.
Howell, 1870 = Howell, C.W. Survey of the Bayou Teche, Cartographic Division, Natural Archives.
Hunter, 1949 = *Steamboats on Western Rivers: An Economic and Technological History.* Harvard University Press.
Latour, 1964 = Latour, A. Lacarriere. Historical memoir of the war in west Florida and Louisiana in 1814-1815. Facsimile reproduction of the 18th edition. University of Florida Press, Gainsville.
Lonsdale, 1964 = Lonsdale & Kaplan
Lytle, 1975 = Lytle, William M., and Forrest R. Holdcamper, 1975
Merchant Steam Vessels of the United States, 1970 - 1868
(Revised and edited by C. Bradford Mitchell).
Steamship Historical Society of America, Staten Island, New York.
McWilliams, 1981 = McWilliams, R.G. Iberville's Gulf Journal. University of Alabama Press.

Marchand, 1931 = Marchand, S.A. The Story of Ascension Parish, La. Donaldsonville, La.

Marx, 1971 = Marx, Robert F., 1971
Shipwrecks in the Western Hemisphere. Scott Publishing Company, Eau Gallie, Fl.

Norman, 1942 = Norman, N. Philip, The Red River of the South. Louisiana Historical Quarterly 25:397-535.

Pearson, 1981 = Pearson, Charles E., E.K. Burden, S.M. Gagliano, P.F. Hoffman, A.R. Saltus and W.H. Spencer, El Nuevo Constante: Investigation of an Eighteenth Century Spanish Shipwreck off the Louisiana Coast. *Louisiana Archaeological Survey and Antiquities Commission, Anthropological Study 4.*

Raphael, 1975 = Raphael, Morris. 1975. *The Battle In the Bayou Country.* Harlo Press, Detroit, Michigan.

Saltus, 1985 (or 1986) = Saltus, Allen R., Jr. 1986 *Submerged Cultural Resources Investigation of the Western Portion of the Maurepas Basin with Intensive Underwater Surveys at Hoo Shoo Too Landing, 16 EBR 60, Colyell Bay, Catfish Landing and at the Mouth of Bayou Chene Blanc.* Submitted to Division of Archaeology, Department of Culture Recreation, and Tourism, State of Louisiana.

Shomette, 1973 = Shomette, Donald G., 1973
Shipwrecks of the Civil War.
Donic Ltd., Washington, D.C.

State Site Files = Archaeological files at Louisiana Division of Archaeology.

Stout, 1985 = Stout, Michael E. 1985. *Remote Sensing Investigation of the Citrus Lakefront Levee Mobilization Sites, Lake Pontchartrain and Vicinity Hurricane Protection Project Orleans Parish, Louisiana.* U.S. Army Corps of Engineers, New Orleans District.

SUDTCIA, 1979 = U.S. Department of Transportation, 1979 Coast Guard,Information, and Analysis Staff.
Commercial Vessels Sinking in the Mississippi River From 1963 Through 1978. Computer Printout on File. G-MA/TP 25, Washington, D.C.

Suter, 1874 = Map of Reconaissance of the Mississippi River. By: Major Charles R. Suter, Corps of Engineers. MRC, Vicksburg

Times-Picayune, (year) = Times-Picayune Publishing Corporation, New Orleans, Louisiana. 1914 - .

USCS = U. S. Coast Survey

USCG, 1986 = U.S. Coast Guard, 1986.
Computer listing of wrecks and hazards for the Gulf of Mexico region. (received from the 8th Coast Guard District, New Orleans)

USCGS = U.S. Coast and Geodetic Survey Charts

USDA, 1980 = U.S. Department of the Army, New Orleans District, Corps of Engineers Mississippi River, Gulf Intracoastal Waterway, Gulf of Mexico, and other Sinkings, December 1967 - December 1979. MS. on File.

USHO = U.S. Hydrographic Office Wreck Information List.

USND, 1971 = U.S. Navy Department
Civil War Naval Chronology, 1861 - 1865.
Government Printing Office, Washington, D.C.

Way, 1950 = Way, Frederick, 1950
Way's Directory of Western River Packets.
Frederick Way, Sewickley, Pennsylvania.

Way, 1983 = Way, Frederick, Jr., 1983.
Way's Packet Directory, 1848-1983. Ohio University Press, Athens.

WCNAC = Wreck Chart North Atlantic Coast

WPA Navigation = WPA Navigation, 1937 - 38. Survey of Federal Archives in Louisiana 1937 - 38 Navigation casualties: 1866-1910, on the Mississippi, Red, Ouachita, Yazoo, Pearl, Alabama, Apalachicola, Louisiana, Texas, Florida, Mississippi, and Alabama, including those of the 10th district. Unpublished Works Progress Administration of Louisiana Ms., A Project Sponsored by the Louisiana State University. Ms. on file, Louisiana State Museum, New Orleans, Louisiana.

WPA Wreck Report = WPA Wreck Report, 1937 - 38. Survey of Federal Archives in Louisiana 1937-38 Wreck report: A record of casualties to persons and vessels on the Mississippi river, its tributaries, on lakes and other waterways of the U.S. customs district port of New Orleans 1873 - 1924. Unpublished Works Progress Administration of Louisiana Ms., A Project Sponsored by the Louisiana State University. Ms. on file, Louisiana State Museum, New Orleans, Lousisana.

46. REMARKS: Written comments (80)

47. DATEREC: Date when record was completed; given as Mo, Date, Year 00/00/0000 (10)

48. RECORDER: Initials of individual completing record. (12)
BF = Bill Flores
CP = Charles Pearson
GS = Ginger Spielmann
AS = Allen Saltus
GC = George Castille

49. HISTWREF: Designates shipwreck is known from historical documents only (1)
1 = yes
2 = no

50. ARCHWSITE: Designates shipwreck is known as an archaeological site (1)
1 = yes
2 = no